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INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

Edited by

H. A. Hare, M.D.

Professor of Therapeutics and Diagnosis in the Jefferson Medical College,

GENERAL THERAPEUTICS,

and

Edward Martin, M.D.

Formerly Professor of Surgery in the University of Pennsylvania,

SURGICAL AND GENITO-URINARY THERAPEUTICS.

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ORIGINAL COMMUNICATIONS.

THE TREATMENT OF SUMMER DIARRHEA.[1]

BY J. P. CROZER GRIFFITH, M.D.,

Professor of Pediatrics, University of Pennsylvania.

Diarrhea, as is well known, may be dependent upon a large variety of causes. Consequently the term "summer diarrhea" is a rather vague one, and might be applied to any occurrence of looseness of the bowels in summer-time. In the narrower sense, and as affecting the first two years of life, it may be said to depend upon four different conditions: (1) acute intestinal indigestion; (2) acute gastroenteric intoxication or infection; (3) acute ileocolitis; and (4) that form of chronic diarrhea which follows very frequently upon the last mentioned of these, or upon gastroenteric infection, or which, independently of these, may be called the chronic diarrheal form of chronic intestinal indigestion in infancy. The division between these is not very sharply defined, but it is necessary to review quite briefly some of the characteristic symptoms, inasmuch as the treatment to be employed depends, in some respects at least, upon which one of these conditions is operative.

In *acute intestinal indigestion* the process is almost entirely local. It depends upon overloading of the gastrointestinal canal with too much food, or the use of a diet unsuited to the patient, in which either the protein, fat or sugar may be in excess. Various other diseases are predisposing causes, among these rachitis being prominent. Chief of all influences, however, is the effect of hot summer weather and of artificial feeding. The chief symptom is diarrhea, usually associated with gastric symptoms at the onset, especially vomiting. There is likely to be fever, sometimes high, but this generally disappears in about twenty-four hours. There are such symptoms as intestinal pain, restlessness, and the like. The stools contain undigested milk, oftenest in the shape of curdy masses in a watery fluid, and more or less mucus may be present. The color varies from yellow to white or green. The principal characteristic of this form of summer diarrhea is the absence of toxic symptoms. It is true that these may develop later if gastroenteric intoxication comes on as a sequel, as it so often does; but a few days' observation will show us that we are dealing, at least primarily, with mere indigestion. The first principle of treatment is the stopping of the food and the emptying of the bowels. No food at all should be given for twenty-four hours or more, or at the most a thin barley-water or albumen-water. The emptying of the bowel by enema is in order, but this is not sufficient, as it reaches only the lower portion of it; and a purgative of castor oil, calomel, or magnesia should be administered. After this such remedies as bismuth may be employed, with perhaps small doses of opium, these two being intended to check the secretion of liquid and to diminish the peristalsis.

[1]Part of a symposium read before the Philadelphia Pediatric Society.

Opium, however, should not be given as long as fever and abdominal distention are present.

Gastroenteric intoxication is a much severer form of diarrheal disturbance, and the one to which the titles "summer diarrhea," "milk poisoning," "cholera infantum," "food intoxication," and the like, are commonly applied. Ordinary intestinal indigestion may precede it, but it may develop quite suddenly, particularly if the weather is very hot and the digestive functions correspondingly interfered with. The bacteria in the intestine increase greatly in number; but whether these are the cause of the diarrhea, or whether the condition depends upon chemical changes and disordered metabolic processes, is much disputed. In view of the fact that the disorder is very much lessened by strict care of the milk which is given to the child, it would seem likely, contrary to the view of Finkelstein and others, that bacterial influence, either direct or indirect, has very much to do with the process. There is, however, no one germ which can be called the cause of the disease. As regards symptoms, to the diarrhea which is seen in ordinary indigestion are added the evidences of very decided toxemia. There is fever of longer duration than in the first disease, and not infrequently great prostration, sunken eyes, unconsciousness, or even convulsions. Vomiting may be present and severe, or be entirely absent. Generally it soon stops, or becomes a minor symptom. The toxemic state may be present from the beginning. In the more favorable cases the severity of the symptoms diminishes as the diarrhea begins, and the temperature falls; and in a week or more the stools grow less frequent and are of a better character. Before this they are liquid and of a greenish or pale-yellow color and contain but little fecal matter.

In still more severe cases of this form the evidences of alimentary intoxication are even more marked. Very probably we are now dealing with an acidosis. That the direct cause here is some fault in metabolism depending upon the nature of the food seems probable, because the symptoms in favorable cases disappear when nourishment is withdrawn, and only then. In still another class of cases we encounter choleriform diarrhea, often called "cholera infantum." This form is by no means common. In it there is extreme prostration, often high fever with coldness of the extremities, and the passages from the bowel, at first like those of the milder form, soon become almost colorless and extremely frequent.

With this preamble regarding the causes and symptoms of acute gastroenteric infection, we are prepared to consider its treatment. Prophylaxis is of very great importance. Weaning of the child should be discouraged, especially in summer-time. The longer the child can be breast-fed, the less liable is it to suffer from this disease. Every precaution in the case of bottle-fed infants should be taken to preserve an aseptic condition of the bottles, nipples, and the food. Pasteurization of the milk should be employed in hot weather; and by this I mean pasteurization even of the best milk, and pasteurization which is done at home. I do not feel justified in trusting the commercial pasteurization of milk over which one can have no control. When the weather is unusually torrid, it is a wise plan to diminish the amount of food and the frequency of feeding, and often the strength of the food as well. The saving of the digestive power of the patient by prompt removal from the city during the hot weather is a matter of vital importance. The child should be bathed every day, and in very hot weather several short immersions in the tub daily are sometimes useful. The clothing must not be too warm, and on the other hand must not be of such a nature that the surface of the body is readily chilled.

When we come to the treatment of the attack itself, the initial methods are much the same as for ordinary acute intestinal

indigestion. The food should be at first withdrawn absolutely. Many children would be spared a more serious attack if this were always done. Even breast-fed children should have nothing but water or thin barley-water for at least twenty-four hours, and bottle-fed children for even a longer time. Return to the ordinary milk-diet should be made very gradually, albumen-water, broth, or barley-water taking its place. The child should be kept at rest, and warm baths of 100°F. may be given for the fever. This is much better, I believe, than sponging. The child should have plenty of fresh air and often should be removed from the city. Medicinal and local treatment are entirely symptomatic. A purgative should be administered promptly, castor oil being one of the best if there is no vomiting. The colon should receive an irrigation of normal salt solution, or often still better, of a one-per-cent solution of bicarbonate of soda. If the fever is very high the irrigation may be cool. Lavage of the stomach with a one-per-cent solution of bicarbonate of soda is sometimes useful early in the case if vomiting is troublesome. There should be not too much haste in the checking of diarrhea early in the attack, provided the child is in good general condition. On the other hand, if diarrhea persists it does not do to let it continue too long, and just as soon as the symptoms of intoxication are better, and distention of the abdomen by gas disappears, astringents and opium may be required. In these cases there is often far too great a loss of liquid from the system and the peristalsis is too active, and the continuation of this condition maintains the loss of alkalies and the resultant acidosis which is often the greatest danger. In the severe cases with very marked toxemia from the beginning, in which we are sure we have an acidosis active, full doses of alkalies are needed, and hypodermoclysis or intraperitoneal injections with normal salt solution may be required. In the cases of choleriform diarrhea it is absolutely imperative to check the loss from the bowel as promptly as possible, and nothing will do this as effectively as morphine.

I want to say a word further here about the use of opium in these conditions. There was a time when physicians gave it to every child with diarrhea. Then came a reaction, which still exists in many quarters, and many physicians look upon it with dread. I am convinced that properly used it is one of the best remedies we have. We must remember that marantic infants are very easily affected by it and that the dose must be small, but this does not mean that they should not have it at all.

Ileocolitis differs from the other forms of summer diarrhea mentioned in that the element of inflammation of the intestine is added. In acute indigestion there are no pathological lesions, except, perhaps, the congestion. In gastroenteric intoxication there are degenerative changes. In colitis there is inflammatory infiltration. The disease is due to many causes. It may follow upon acute gastroenteric intoxication, or the chronic intestinal indigestion of atrophic children. It is particularly prone to appear in summer-time. It is also at times distinctly epidemic and infectious; but whether it is contagious from one child to another is not definitely known, although it seems probable. The exciting cause is undoubtedly a germ, but it would be a mistake to believe that the dysentery bacillus is the necessary agent. This germ, it is true, is present in many cases, but so also it may be found in children with diarrhea not of a dysenteric character, and even exceptionally in the stools of normal infants. In some cases an agglutinative reaction has been found with the streptococcus.

As regards the symptoms, we do not have here so much a great loss of liquid from the system in large fluid passages as the occurrence of very numerous stools with little fecal matter and much mucus, accompanied by straining, the amount of the latter depending upon the severity of the case. The element of the predominance of mucus with

the continuation of fever is a characteristic feature. In the way of therapeutics the dietetic treatment for the beginning should be that recommended for any of the forms of summer diarrhea. Very soon, however, it is necessary to administer nourishment, since ileocolitis at best is liable to last some weeks, and the appetite is poor. Stronger cereal decoctions in the form of gruels are excellent, and these may sometimes be dextrinized with advantage. Albumen-water, beef-juice, broths, the latter thickened with starchy additions and often containing the animal fiber in a finely divided form, are also of service. The return to milk must be made with the greatest caution. Change of climate is often helpful, and the supplying of abundance of fresh air is essential, as it is in all the forms of the disease. At the beginning of an attack a purgative should be given and the intestine washed out with normal salt solution. After this we may follow one of two plans of treatment: First, the giving of a purgative, such as castor oil, every day until the character of the stools changes; or, second, the administration of an astringent, such as bismuth, combined with opium. We must remember that we are not dealing here with an intoxication, but with an inflammation, and that the continued fever depends on this. Consequently, provided we have no reason to think that any irritating substances are still in the bowel, there is no objection to the second course. In fact, it is the one which I prefer. The intestine should be washed out two or three times daily with large douches of saline solution, or, if there is much straining, with starch-water. I make very little use of astringent enemata of nitrate of silver, tannic acid, and the like, as they often, it seems to me, increase the tenesmus. On the contrary it is well, as the disease continues, to stop injections of any sort from time to time, inasmuch as the continuation of treatment of this kind sometimes serves to maintain the undue secretion of mucus. The pain and tenesmus are to be relieved by opium. Of course every measure must be employed to sustain the general strength of the patient.

Last of all comes the fourth form of summer diarrhea; that which may be called *chronic diarrhea*, as seen in chronic intestinal indigestion, or as a chronic ileocolitis. This is one of the most troublesome forms of the disease, especially in summer-time. The acute symptoms have now passed; there is no more fever or only that of an irregular and intermitting type, or occurring in exacerbations. The general health becomes badly affected; the child wastes, and malnutrition may become extreme. The stools are watery, greenish, containing curdy masses of various size, and a variable amount of mucus, this last being in large quantity if chronic inflammation of the intestine is present. The metabolism of the child is badly affected as well, and it sometimes reaches the point where no matter what food is given loss of weight continues or even increases to a degree which cannot be explained by the mere intestinal symptoms. The treatment here is dietetic, but the choice of the food to be used is one of the most puzzling of questions. When it can possibly be obtained, breast-milk should certainly be supplied. In many cases it is the only thing which will save the infant's life.

It is this form of chronic summer diarrhea with malnutrition which constitutes probably the majority of cases seen in hospital practice in summer. The study of the stools may often be of great aid in this matter. When we have liquid, frothy stools which irritate the buttocks, it is probable that an excess of carbohydrate, especially of sugar, is being administered. When the stools are liquid, green, and with numerous larger or smaller white curdy masses, it is the fat which is in excess, *not* the protein. When there is a very offensive odor present, we may assume that in addition to other troubles a decomposition of protein is going on. The choice of the food will depend upon what element of it we

believe to be at fault. Buttermilk is often a very valuable remedy when there is fat-indigestion; but to make it of sufficient strength to furnish the proper number of calories it must be fortified by the addition of wheat-flour and cane-sugar. In fact some sort of sweetening is necessary in any event, as the children otherwise will refuse it. Whey serves a good purpose in many instances, although it, too, is of weak caloric strength. It contains much the greatest part of the natural sugar of the milk, but very little fat, and the casein has, of course, been removed. Skimmed milk mixtures are suitable when the stools are curdy and when suitable buttermilk cannot be readily obtained. A very serviceable diet is the Eiweiss milk of Finkelstein and Meyer, best called, I think, casein-milk, since the fact that its large proportion of casein is one of its principal characteristics can well give it this name. The fat-percentage is moderate only, and the sugar-percentage low; whereas the salts have been reduced also by the removal of the whey.

Sometimes in diarrhea one sugar is borne better than another, and it may be well instead of using sugar of milk to substitute saccharose or a dextrin-maltose prepartion. The value of the addition of an insoluble carbohydrate, as in the case of the buttermilk mixture referred to, is often very great. In some way not entirely understood this certainly mechanically helps the digestion. Medication of any sort is of comparatively little importance. Bismuth may be used as in summer diarrhea of other forms to check the evacuations when too frequent. The administration of castor oil at intervals is valuable when the character of the stools begins to deteriorate; and often after this treatment a nearer approach to the normal color and appearance will be seen. Temporary starvation must be used during the exacerbations. Here, however, one very important fact is to be emphasized, namely, that in the case of badly marantic cases which have been suffering from diarrhea and indigestion, and which have developed one of these exacerbations, any rigorous starvation may be dangerous. It should be done principally when symptoms of intoxication develop, and then must not be long continued. Of course the strength of the child must be maintained in every way, and it is noteworthy that these infants frequently run a subnormal temperature and bear chilling of any sort very badly, and the frequent employment of hot-water bottles and bags is an essential. They should, of course, have fresh air, but they often do not properly tolerate days which are cool, or bear exposure to draught. Very frequently oil must replace the use of the tub-bath or of sponging.

In this connection reference should be made to the attempt to treat diarrhea by a direct modification of the bacterial flora of the intestine. Kendall and Smith, and others, believe that the favoring of the growth of lactic acid bacilli in the intestine, either by the giving of cultures, or of food such as carbohydrate, upon which these organisms thrive, will inhibit the development of the dangerous proteolytic bacteria. Good results have been reported in spite of the fact that this theory is directly opposed to that of Finkelstein, to the effect that the nature of the bacteria has little to do with the disease. It is impossible as yet to determine the true value of the method. It is one which should certainly be tried in suitable cases, in addition to other treatment outlined.

THE IMPERATIVE NEED OF EXAMINING ALL TISSUES REMOVED AT OPERATION IF TREATMENT IS TO BE EFFECTIVE.

BY WILLIAM NEILL, JR., A.B., M.D., BALTIMORE, MD.

The tissue removed at an operation never gets out of the horizon of any first-class surgeon until he has an authoritative report upon it, but unfortunately this corollary to an operation is often overlooked by some excellent men aspiring upwards. Those of us who are associated with large institutions where we see a great number of patients, continually have the misfortune of this omission impressed upon us. In so many cases no tissue was saved from the operation for study; all went at once into the bucket on its way to the incinerator, and no one studied it attentively in the effort to make an accurate diagnosis. In this way patients' chances of permanent recovery may be reduced manifold, when a careful diagnosis and study by a competent pathologist, at or near the time of the operation, would have suggested other treatment or closer subsequent observation. One ought never to leave tbe recurrence of the disease to be the only means of confirming or correcting a diagnosis. The average medical man may not care to do surgery, but when a surgical operation is performed on a patient of his, he too ought to see that the patient derives the maximum advantage and benefit by noting and attending to this very detail, even if the surgeon is inclined to slight it. Our country to-day is full of excellent surgeons who are far superior in their diagnoses and operative methods, and in all points in technique, to the great lights of surgery forty years ago, but in this particular matter they are often no better than their remote untrained predecessors. It is also true that this care constitutes the maximum difference between a true surgeon and a quack; the neglect of it enables the quack to magnify his work by calling every blemish a cancer.

I venture, therefore, to offer this earnest advice: when tissue is removed at operation, three steps are imperative: (*a*) It should be sent to a pathologist; (*b* and *c*) a report should come back and be filed with the history, which is incomplete without it. In this way we clearly recognize cancer, syphilis, sarcoma, Hodgkin's disease, tuberculosis, and often other rarer pathological conditions. Such a correct laboratory report materially modifies prognosis, and if it is made during the progress of the operation it often changes its whole course. At the operating table, with this step in view, one should have at hand a small glass bottle, with a large neck, containing one ounce of a 10-per-cent formalin solution, with a label giving date, patient's name, surgeon's name, and the region from which the tissue was removed.

Drop the specimen at once into the bottle, and see to it that it is from a characteristic part of the disease, and not merely adjacent to the real lesion. Choose a competent pathologist in any large medical school or recognized laboratory. Be sure to send a brief clinical record of the case along. There are some professed pathologists whom one would hesitate to trust with the life or death of the patient; so at all times, as with the choice of a surgeon, the best is none too good. Such examinations and reports cost about from $5.00 to $10.00. If the patient is poor, doubtless on request the examination would be made for nothing, when the doctor himself does the operation without charge. In our laboratory not infrequently tissue sent in diagnosed benign has after further careful study proven to be malignant, and *vice versa.*

The following five cases, picked at random, well demonstrate the importance of a correct pathological diagnosis. Such cases as these are unfortunately met with frequently.

Case 1.—White, male, aged twenty-two years. History number 4914. A case in which the tissue was thrown away and a

false diagnosis made on a guess. Two weeks before being seen his surgeon had removed from the left side of the neck a conglomerate mass of glands which he had first noticed five months previously, and which were gradually growing larger. Two months prior to this he had some difficulty in breathing through his nose. The tissue removed at operation was not saved nor studied, and he was told he would probably have no further trouble. Examination on admission showed an unhealed scar in the neck 8 cm. long. Definite induration above thyroid cartilage, and an examination of the nasopharynx showed an extensive growth. The tissue which we removed from this revealed an endothelioma.

Case 2.—White, male, aged twenty-seven years. History number 2947. A case of syphilis wrongly diagnosed cancer. Ten months ago a small pimple developed on the left cheek which gradually grew larger, until it broke down, and involved nearly the whole of the cheek, the upper lip, and the buccal mucous membrane inside the cheek. It presented a dirty, foul-smelling, scabbing area, with an irregular granulating base, with fairly well defined margins. A Wassermann examination of the blood had been done and reported negative; also a clipping of tissue from the area had been diagnosed epithelioma. A blood examination made in our laboratory revealed a Wassermann four plus. He evidently had syphilis and nothing more. With the combined treatment of salvarsan and mercury the condition cleared up entirely in six weeks.

Case 3.—White, female, aged thirty-six years. History number 4488. A false diagnosis made and a big and unnecessary operation to be done. For the past year there has been a sore spot at the gum margin opposite the base of the lower left canine tooth. This became a small rounded tumor after eight months, and an operation was performed in which the three teeth (canine and both bicuspids) were extracted, and the growth cut out with the cautery. A pathological diagnosis of sarcoma was made, and after two months there was a recurrence. She came here at that time with a small granular tumor on the gum margin at the site of the previous operation. A small piece of tissue removed in our laboratory revealed tuberculosis.

Case 4.—Mr. S., aged fifty-five years. History number 4913. Extensive operation; much tissue taken; no diagnosis. Later examination revealed carcinoma of mouth. Nine months ago a physician incised a small painless lump on the lower left posterior alveolar arch. This stimulated its growth, and four months later a surgeon excised the whole mass, which at that time extended into the angle of the jaw. No study was made of the tissue removed. This growth returned in four weeks and continued to increase in size and caused severe pain. On examination five months later there was a large fixed vegetative growth occupying the whole inner and posterior side of the mouth, involving the tongue, soft palate, and inside of the cheek; a large gland at the angle of the jaw. Clipping taken revealed a squamous-celled carcinoma.

Case 5.—White, male, aged thirty-six years. History number 4862. Extensive operation performed on a case of syphilis wrongly diagnosed tuberculosis. For a year past had noticed a painless enlargement at the angle of his left jaw, gradually increasing in size. Four months before admission this was removed by his surgeon. No tissue was saved or studied, but he was told that he had tubercular glands, and to expect no further trouble. Examination showed a healed scar in the neck 10 cm. long, and a well defined mass at the angle of the jaw 8x6x3 cm.; also palpable axillary and epitrochlear glands. A blood examination revealed a Wassermann four plus. Salvarsan combined with mercury caused a complete disappearance of the mass in four weeks. A careful pathological examination of the tissue removed here would have enlightened both operator and patient and would have saved a world of trouble.

THE TREATMENT OF NARCOTIC DRUG ADDICTION IN PRIVATE PRACTICE.

BY THOMAS S. BLAIR, M.D.,

Chief, Bureau of Drug Control, Pennsylvania Department of Health, Harrisburg, Pa.

The successful treatment of the drug addict is just as much a clinical matter as is that of any disease or syndrome.

It comes to the new practical worker as a distinct shock when he finds that "dope fiends" are rare; that the much-exploited brilliant habitué is a *rara avis;* that the criminal addict is a criminal first and an addict afterwards; that the alleged police-defying, shrewd genius that peddles drugs is actually a sordid individual of low mentality, and that the whole excitable "reformer" class vastly overstate the narcotic proposition.

As a practical matter of fact, drug addicts are simply very human people and divided into several classes, even as are other people. Most of them are not possessed of marked peculiarities aside from their addiction; but as regards the addiction they are a worried, harassed class trying to keep a secret, and most of them are secretive to the point of expertness and will lie about matters concerning the addiction while honorable citizens in other regards.

Babes at the breast are sometimes addicts because their mothers are, and they grow up perverted, abnormal individuals of peculiar temperament unless, as is common, they die after being weaned. It is highly necessary for the physician to recognize these most unfortunate cases, for they should be taken from the breast gradually, thus accomplishing a reduction treatment; and, in case of necessity to wean suddenly, they must be reduced otherwise. In my own experience with such cases the drug has been given by inunction, and this plan has worked very well.

Not so many years ago many children became addicts to "coke," as cocaine was called, and to "snow," as heroin was called; but this nefarious traffic among children has been largely suppressed. The cocaine addicts were readily enough cured of their addiction, for cocaine can be rather promptly left off without much difficulty. Not so as regards any of the derivatives of opium, and heroin seems to obtain a definite hold more rapidly than do the other alkaloids of the poppy, and the cure of the addiction to heroin is far from a simple matter, even in children. Some years ago Pettey contended that the heroin habit was not very readily contracted, but this idea has been abandoned in the light of recent experience, at least by most observers.

"Baby drops" sometimes constitute a source of danger to young children, especially in the hands of indiscreet mothers. The results are often disastrous. It is all very well to preach the doctrine of "throwing the vile stuff away," as is commonly done; but, in my experience, the plan of making a dilution of the "vile stuff" with an elixir of catnip and fennel is more safe and satisfactory, and it seldom takes long to get the little one entirely off the drug of addiction, for under the Federal laws the baby drops contain rather small proportions of narcotics.

The same curiosity that leads a youth to the temple of vice prompts him to experiment with drugs. He may learn the habit from vicious associates, and the same element that maintains commercialized vice is also interested in commercialized drug habituation. So far as our experience in this bureau is concerned, drug habituation among the youth is a city vice, as we receive few such reports from small places. Social surveys lay stress upon drug habits among the youth, for these surveys are mostly made in cities, but in our Statewide survey this factor is not at all prominent. But where we have encountered it we have found the youthful addict a peculiarly difficult proposition, for the drug seems to demoralize the mental and psychic natures and the youthful victim is so unreliable that nothing short of institutional

treatment seems to avail. In a number of such commitments occurring in our work it appears that, under restraint, rapid reduction and intensive elimination is the treatment of choice. Furthermore, after the drug has been entirely withdrawn, restoration is fairly rapid, the patient rapidly gains in weight and makes a full recovery; but he lapses, alas! too often unless he is taken to a changed environment and wholly removed from the old temptations.

The youthful addict is hard to treat in private practice, for he is wayward, headstrong, and hard to control.

We are encountering a few youthful soldiers back from service who have drug habits. They fall into two classes: first, those who received narcotics as an absolute necessity in military therapeutics, and, second, those who are pure addicts. The first class differs in no regard from postoperative cases in civil life in which the use of the drug was, and may yet be, imperatively necessary; and the second class are the type of men who are just as apt to become addicts in civil life as they are in the army. Indeed, army restraint probably prevented many of these men from becoming drug addicts who otherwise would have done so. We fail to see wherein the war has made for drug addiction except as is involved in an increased incidence of serious surgical intervention and the sequelæ of influenza in camp. Nevertheless, we will have a soldier problem, and it is the province of restoration surgeons to make a serious effort to clear up all painful and debilitating surgical lesions and to get these returned soldiers weaned away from the morphine that, in many instances, saved life on the field.

Only those who were in the war hospitals during the influenza epidemic, as we were, can understand the seriousness of the cardiac lesions resultant from the septic types of infection. We have had opportunity to examine some of these men recently, and the cardiac sequelæ are more serious than are those resultant from influenza in civil life. Nothing, we believe, will save some of these men from continued use of morphine except prolonged rest. If they go at once to hard physical labor they will collapse unless they have morphine. The chronic heart case under morphine is, at best, an unsatisfactory one. These soldiers are going back to civil pursuits, and it is incumbent upon their medical attendants to treat them kindly, forgetting all thought of the army making "dope fiends" of them. Some of them need a little morphine even yet, but the greater proportion should be put under treatment in which morphine does not figure except incidentally. It is utterly unfair to call these men "dopes," and, indeed, the term is horribly abused; it is a cruel designation, and even at the worst cruelty has no place in the treatment of drug addiction, however contracted. Remember what our brave soldiers saved us from.

Coming now to the principal problem, addiction in the adult, we have need to eliminate all hysteria. The opium, morphine, and heroin addicts are the only ones that are a serious problem to the clinician, for the cocaine, chloral, and other drug habits are readily cured by comparison. And, be it said, the employment of opiates as taught in reliable texts, and as it is empirically practiced by many physicians, are two vastly different propositions. The indications for opiates in therapeutics are definite and easily mastered. In view of the dangers of addiction, there is little excuse for mere empiricism in this field. Opium is too valuable a drug to abuse and thus bring into discredit; and the same can be said of alcohol, chloral, hyoscyamus, and all the rest of the habit-inducing agents. While the legitimate therapeutic employment of opiates sometimes leads to addiction, this is a mere incident compared to the harm done by unwise and unnecessary use thereof.

And the adult drug addict, what of him? Morbid and unstable individuals who become drug addicts are the "horrible examples" held up too much to public view and reprobation. It is not true that all

drug addicts, nor even one-fourth of them, ever become such creatures as are depicted in fiction and, sometimes, in the perfervid writings upon what should be a solid and conservative reform, not a "nine days' wonder." Thousands of men use tobacco without obvious detriment or becoming bad citizens, though they would probably be better off without it; but some have the adrenal function stimulated, so it is stated, by tobacco, and these men are palpably injured by it. And it must be admitted as a fact in therapeutics that there are many opium addicts who are not casually recognized as such, even though for years addicted. This is not said in defense of opium addiction, but acknowledged as a fact that must be properly evaluated.

Numerous addicts tell me that it requires a month to become addicted to morphine. If this is true, and numerous physicians believe it to be true, the ordinary therapeutic use of the opiates should not breed addiction in most persons. Yet the sudden stoppage of opiates during treatment often occasions discomfort to the patient, and perhaps it is better to reduce the drug gradually after, say, two weeks' administration. And another point as regards addicts is this: adult addicts who have run the dosage up to an excessive amount, but who are otherwise in fair health, have, on account of the high prices and the difficulty in securing drugs, themselves reduced the dosage; and numerous addicts have informed me that they keep comfortable on from four to six grains of morphine a day. This has been the experience in the work in Rhode Island, where clinics have been opened to treat addicts. From a study of numerous cases of this type, I believe it to be practicable for a physician in private practice to reduce the great majority of addicts to this point, and many of them to a smaller dosage, and this without any great difficulty, the length of time required for the reduction depending upon many circumstances to be estimated in each case.

These cases rapidly improve in health and general appearance, and after a time, say during a vacation, many of these long-time addicts "make the jump" and discontinue the drug entirely. I could cite numerous cases of this type who have fully recovered to my own personal knowledge, and others are reported to the bureau by mail. These are the people that, to my mind, are ideal cases for the Lambert and other intensive methods of cure; that is, after they have been reduced to four to six grains of morphine a day and have become adjusted thereto. In my own experience the intensive method leaves too great a degree of debility and psychic disturbance to be advisable without due preparation, except in the case of young and sturdy people who have not been long addicted. Yet I have seen brilliant results follow this method in a few cases of long-time addiction, although there are more failures to record among such cases—that is, they relapse. The method is a success so far as getting the average case off the drug is concerned; but that is not the whole problem. The method appeals to me, for it is definite and practicable in so many cases that it seems strange that so few private practitioners attempt it. The whole technique has been published and is entirely available. The after-treatment, however, should be emphasized; it is readily enough followed up by any intelligent and tactful physician.

Grafe, of Cleveland, Ohio, I believe it was, first suggested a gradual reduction treatment for morphine addiction that has been most successful in my hands. Briefly, it is as follows: Make up an aqueous solution of morphine sulphate and another one of strychnine sulphate. Give of the morphine solution very nearly enough to represent the accustomed dosage of morphine, but add a small quantity of the strychnine solution thereto. Gradually reduce the dosage of morphine and run up the strychnine, until no morphine is given but full physiological dosage of strychnine. Continue for a while; then begin to reduce the strychnine by adding to the mixture an aqueous solution of quassia chips, until

finally nothing but quassia is given. These solutions look and taste much alike, are readily adjusted to the needs of the individual case, and the patient is unaware of the extent of reduction practiced.

In general, physicians have poor success with the reduction treatment. With a pure addiction, the patient otherwise in good health, and not over forty-five or fifty years of age, success should be more general. Naturally, in an institution the method should succeed better than in outside practice; but any properly conducted general hospital with good nursing service affords all the refuge that is needed in most cases. The trouble, as I view it, with the reduction treatment is that, as commonly employed, it is entirely too gradual. It is no kindness to the patient to unduly lengthen his ordeal, for it *is* an ordeal to get rid of morphine, either quickly or slowly. The physician who expects to "cure the morphine addiction without any suffering or inconvenience to the patient" rarely succeeds. On the other hand, if he views the problem as one of treating disease, giving a little chloral if necessary, or any other drug or treatment rationally indicated, and expects the patient to be a sick man, there is no reason why, with tact and firmness, he should not have a fair degree of success. Of course the case-management has many factors aside from medication, but these phases have been so often discussed that the reader is already familiar with them.

The addict with disease other than addiction, often a chronic disease, is a difficult problem. Some of them cannot be cured, since the disease maintaining the addiction cannot itself be cured, and the patient must be classed as an addict with incurable disease. The problem is to give modern and effective treatment to the underlying disease. If this is successful, the addiction can then commonly be cured also. Most of these cases of disease are, at least, susceptible of relief, and the dosage of morphine can then be reduced gradually, often to a very small daily amount. And there are other cases in which the patient may get along nicely with a little morphine only when there is unusual stress or pain. Then, too, substitute drugs are often effective and morphine may be all but eliminated.

Yet it is a fact which we often find instanced in our work that there is a world of human wreckage the result of inadequate or no treatment plus drug addiction. Some are surgical cases, some dental, but most are purely medical. Old focal infections giving rise to what is called "rheumatism," uncompensated cardiac lesions, untraced neuralgic cases, neglected cases of cystitis and other genitourinary diseases, surgical cases needing a second operation, many rectal lesions, etc., are often susceptible of relief or cure, and the addiction may then be treated with prospect of success.

Malignant disease and other actually incurable cases are often so aggravated that morphine is positively demanded, even in ascending dosage. Here, treatment of addiction is often unwise, and it is rarely successful.

The aged addict, having taken the drug for forty years, as many have, is rarely cured. Yet much can be done for these people. We have reports here of some of them actually being cured of the addiction. As a rule they are taking excessive dosage, and it is a positive advantage to push reduction to some degree, to be determined according to the case.

A difficulty in the treatment of addicts is the fact, for it is a fact daily appearing on our records in this bureau, that the unrestrained addict usually visits more than one physician, sometimes several at one time, and procures quantities of the drug out of all proportion to his needs.

Another fact also daily appearing on our reports is that relatively few physicians succeed in the treatment of addiction. Comparatively few physicians are of the right temperament, even some of them making a specialty of treating drug addicts. The most unsuccessful man, unfortunately, is the one of keen sympathy for the addict. Firmness is a prerequisite to success in this

field. Then, too, the physician must be definitely interested in his case. Above all, he must be a good diagnostician and a capable and modern practitioner.

Prevention, as in other fields, is the most important factor in eliminating drug addiction; but that is not the subject now under discussion.

We earnestly hope that more physicians than are at present doing so would undertake the treatment of the drug addict. There are so many addicts that a mere handful of them can get proper institutional treatment, and it is becoming increasingly necessary for private practitioners to undertake this work. And, above all, we wish that the general hospitals would enter this field. Admittedly it is a trying proposition to treat the addict, but just why so overwhelming a proportion of the general hospitals refuse to treat these cases does not appear. Doubtless the reasons are many. "The harvest truly is plenteous, but the laborers are few."

THE TREATMENT OF COLDS.

OSBORNE, in the *New York Medical Journal* of March 29, 1919, states that a cold may be aborted in the early stage. Primarily of importance is a brisk cathartic, a milk and cereal diet, and a greatly restricted intake of liquids, even if the patient is thirsty, though he may sip liquids, and take small amounts of lemonade, or eat oranges. To further this abortive treatment and stop the congestion of the mucous membrane from becoming greater and finally pouring out large amounts of mucus, 1/500 grain of atropine sulphate should be given, to an adult, every two hours, for five doses, and then every three hours for five more doses. A child ten years old could have this dose every three hours for five doses, and then every six hours for five more doses. The throat and mouth may be washed with a mild alkaline wash, as liquor antisepticus alkalinus, diluted with an equal part of warm water. This may be used every two or three hours. Nasal sprays are inadvisable at this stage. Many colds are aborted by this treatment. Hot baths, body baking, and electric light baths, if one has the opportunity to take such treatment, by bringing the blood to the surface of the body and then relieving the congestion of the nose and throat, may aid in aborting a cold. If there is much fever, a dose of antipyrin may be advisable. [With this we disagree.—ED.]

The treatment if the cold progresses differs from the foregoing. The object at this stage of the cold, as the congestion of the mucous membrane is severe and it will not abate until the secretion of mucus is free, is to hasten this secretion or excretion. Consequently, atropine should be stopped, and ammonium chloride may be given, best in syrup of citric acid and water. If there is an irritable cough, codeine may be added to this mixture. If there are apparently influenzal symptoms in the patient, viz., severe backache, headache, and more or less fever, one or two small doses of acetanilide may be given; or acetyl salicylic acid in two or three doses. It is not necessary to continue these drugs more than two days, at the most, perhaps not more than one day. Such a patient must remain in bed for two or three days at least.

If the cough becomes productive and not irritable, the ammonium chloride mixture may be continued, but without the codeine. If the expectoration is profuse, terpin hydrate may be substituted for the ammonium chloride. It should always be given in powder or in capsule, or if a tablet is given it should be crushed before swallowing. If the patient has difficulty in raising the mucopurulent secretion from the bronchial tubes, and it is sticky and hard to expectorate, sodium iodide in small doses is the best treatment. After any cold the patient requires a tonic, such as a capsule of quinine 0.10 gramme, reduced iron 0.05 gramme, and strychnine sulphate 0.0015 gramme, three times a day, after meals. If there has been any congestion of the ears, the quinine should be omitted. Some liquid bitter tonic may be given, if it seems preferable.

EDITORIAL.

ACIDOSIS.

At the present time we think there is danger that the profession is attaching too much importance to the condition which is called with more or less inaccuracy acidosis. Indeed, with certain persons acidosis amounts to a fad, and all sorts of complications in the course of various diseases, varying from puerperal eclampsia to influenza, are thought by them to be due to diminished alkalinity of the blood or of the liquids in the tissues. There is, however, very little evidence of scientific value in support of these views. They are usually upheld on the ground that the patient who has been fed a large amount of alkali has gotten better or gotten well, or the belief that the patient is suffering from acidosis rests upon the more accurate determination of the diagnosis by the finding of acetone in the urine. The fact is overlooked that any cause which interferes with nutritional processes and which more or less results in inanition, or starvation, as for example the various infections, causes the body, for a time at least, to live upon itself and thereby produce substances which after they are oxidized and rendered innocuous appear in the urine as acetone. Very few persons who are ill take a sufficient amount of food to maintain nutrition as it is ordinarily maintained, and when acetone is found in the urine some jump to the conclusion that it is proof that the symptoms presented are the result of acidosis, when in reality the symptoms are due to an entirely different cause and the acetone in the urine is merely an indication of perverted nutrition.

In some instances in which alkaline solutions are given in excess the benefit is attributed to the alkali, when in reality it should be attributed to the increased quantities of water which are made to pass from the tissues to the kidneys. Without doubt in certain instances when the kidneys are impaired, and in which the task of eliminating these alkalies is rendered thereby impossible, a great deal of harm is done by attempting to make the body take more alkali than it normally possesses.

The whole matter of acetonemia, as it used to be called, has received an immense amount of investigation within the last few years, but we do not think that these researches have gone far enough as yet to lead us to universally applicable therapeutic conclusions. Indeed, those who have done most of the work seem free to admit that the problem is a much more complex one than they thought it was when their investigations began.

When a physician, without making any test for an excess of acetone in the urine, makes a clinical diagnosis of acidosis, he is, therefore, making what is little more than a guess. In many instances he does not know how to, or if he does know how to he does not care to, make tests which will determine quantitatively the acetone which is present. In still other instances he is too busy to carry out these tests, and while the qualitative tests are by no means difficult they are too frequently not followed.

Some of the tests are of course simpler than others. One of them, designed especially for general practitioners, has been described in the *Medical Record* by Mitchell of Chicago, who claims that he has carried this test out in so many cases and for so long a period of time that he feels confident of its value. The test consists in adding 3 Cc. of Lugol's solution and 2 Cc. of a saturated solution of picric acid to 145 Cc. of water. This produces a clear reddish liquid which is poured into a white porcelain dish and heated on a water-bath to 180° F. If a water-bath is not available he states that the test may be heated over a flame until fumes are given off, boiling being avoided. The urine is now added in small amounts at a time by

means of a graduated burette or graduate glass. Mitchell states that if acidosis is present the amount of urine needed to turn the bright-red liquid into a bright yellow is very small, so that in severe cases 2 Cc. or 3 Cc. of urine will almost immediately produce the reaction. In cases of moderate severity, 8 to 10 Cc. may be needed, whereas normal urines do not easily affect the color in smaller amounts than 15 Cc. unless the urine is very concentrated. When the urine varies in specific gravity from 1.015 to 1.020 and is normal, it requires as a rule about 20 Cc. or more to cause the reaction. If time is no object and heat is not at hand, a very small amount of urine is to be tested in comparison with an equal amount of normal urine, and the time which elapses before the reaction occurs in minutes and hours is noted and the two reactions compared. This, of course, is a crude method.

Mitchell states further that if picric acid is not at hand, the test with the Lugol's solution and water may be carried out without it, although the test will not be so delicate as if the picric acid is used.

We have not used this test sufficiently to enable us to express any opinion in regard to its value for the general practitioner, but think it of sufficient interest to be worthy of attention.

DIAGNOSIS AND TREATMENT OF SYPHILIS OF THE NERVOUS SYSTEM.

There can be little doubt that a very large number of men and women, particularly men, consult physicians because of their state of general ill health, and often receive much less advantage from treatment than should accrue because the possibility of a latent syphilitic infection is not kept constantly in the mind of the general practitioner.

It is true that the patient is not infrequently asked as to whether he has ever had syphilis, but it is also true that in a very large number of cases when the answer should be in the affirmative it is given in the negative, either because the patient wilfully intends to deceive, because he thinks that a history of infection many years before can have no bearing upon his present ailment, or again because he has been told by some practitioner after a course of fairly active treatment that he may consider himself as cured. There may be, too, social reasons why he wishes to positively deny the existence of any such infection, and all these factors tend to produce a serious hiatus in his history. The symptoms of early nervous syphilis are often as obscure as the early symptoms of any other infection. After they have so developed that "he who runs may read" the diagnosis of ataxia or paresis, the physician deserves little credit if he makes a correct diagnosis, and furthermore, what is more important, he is able to do little for the benefit of his patient. The opportunity for doing good has been almost entirely lost. In some instances a gradually increasing neurasthenia or mental irritability may be the dominant symptom. Under these circumstances the knee-jerks instead of being diminished may be increased, and the pupils will react to accommodation and light, but nevertheless act so sluggishly to light as to lead the careful observer to the conclusion that it will not be long before the light reflex is abolished. After this time the exaggerated knee-jerks become minus, the station becomes impaired, and then the diagnosis becomes more clear. Oftentimes a direct question as to early infection will be answered in the negative, whereas a general line of conversation designed to bring out the true history will develop it.

A very practical but brief article on this subject has recently been contributed by Hunt to the *New York Medical Record*. He points out that in addition to the factors in diagnosis which we have mentioned, a careful study of the vascular system should be made since myocarditis is often associated with nervous lesions due to this cause, and a high arterial pressure

or definite thickening of the arteries is another stone in the arch which leads to a correct diagnosis.

He also emphasizes a point which is familiar to every well-read practitioner of experience, that a negative Wassermann reaction in the blood by no means proves that clinical observations have been incorrect. First, because negative blood Wassermanns are not infrequently obtained in those who have late syphilis and also because there may be an error in the technique of making the test. Furthermore, it may be stated that even if the cerebrospinal fluid gives a negative reaction, nevertheless clinical facts pointing to a diagnosis of syphilis should not be cast aside until the colloidal gold test or the luetin test has been resorted to, and still further it may be necessary, before considering that these negative tests are to be given full weight, to give a provocative test of arsphenamin in order that the test may become positive, since, as is well known, such tests will make the blood positive when before it has been negative.

The use of the *x*-ray examination in studying the condition of the heart and aorta may also be of assistance, particularly if the diffuse form or saccular form of enlargement of the aorta is present.

We are coming more and more to a normal position in regard to the relative value of laboratory methods as opposed to clinical methods. Before the laboratory came on the boards all diagnosis was clinical. Then there was a tendency for all diagnosis to be made in the laboratory, but now the pendulum is swinging to a normal position in which due weight is attached to the results obtained by both methods.

Hunt expresses the belief that while puncture may be followed by headache in many persons, it is usually less severe in those who have an old syphilitic infection than in those who are free from the disease, although, of course, this point is not of sufficient importance to weigh materially in the conclusion reached by the physician.

It is interesting in conclusion to note, although the matter has no direct relationship to syphilis, that Hunt expresses the belief that spinal puncture is an excellent form of treatment for delirium tremens. When the delirium is very great, 30 to 40 Cc. of spinal fluid is removed.

MAGNESIUM SULPHATE AS AN ANTISEPTIC.

The fact that a saturated solution of magnesium sulphate has been used during the recent war as an antiseptic dressing for wounds, and also that it is employed externally as a dressing in erysipelas, makes all investigations as to the method of its action of peculiar interest.

Northrup in the *Journal of Infectious Diseases* for February, 1919, states that women have known for some time that a saturated solution of magnesium sulphate may be used as a substitute for talcum or face powder, and that a small amount of this liquid taken in the palm of the hand and rubbed over the face until dry leaves a "bloom" upon the skin, and that if there is a tendency to pimples these dry up and disappear. This led Northrup to investigate the influence of magnesium sulphate on the organism commonly found in ordinary pimples, the staphylococcus aureus. It is not necessary to give the details of this research, but it would seem that magnesium sulphate does possess distinct antiseptic power not only in regard to the staphylococcus, but also that this salt inhibits the growth of the streptococcus in the skin.

This investigator also quotes Morison and Tulloch in regard to its effect upon the staphylococcus pyogenes, and states that these authors also found that magnesium chloride might be used advantageously in place of magnesium sulphate in that it seemed in some cases to possess more power.

Northrup, therefore, suggests that a further study of the specific action of concentrated solutions of magnesium sulphate, and other magnesium salts, on infected skin, or in wounds, may present interesting results.

WOUND SHOCK.

This subject will remain ever new and of interest until the underlying reasons for its phenomena are matters of proof rather than conjecture, and until based upon a knowledge of these reasons a rational and effective therapeusis has been devised. The comparatively recent studies upon histamin, a drug which exactly produces some of the phenomena of shock, and the discovery of histamin in devitalized tissues, has stimulated physiologists to renew the study; even has inspired in their hearts the hope that perhaps in histamin may be found that underlying cause which has so long and so vainly been sought.

Cannon, who for a brief time looked on acidosis, or rather diminished alkaline reserve, as the underlying factor, has seen more clearly that this is simply one of the accompaniments of the condition termed shock.

In the *Military Surgeon* for May, 1919, Cannon goes further into the matter and first proceeds, if not to deny, at least to express a logical doubt as to the validity of the widely accepted theory, on which is based the explanation of the low blood-pressure, which is probably the most characteristic feature of the symptom-complex of shock. He readily grants the assumed, indeed demonstrated, exhaustion of the nerve cells. He points out that these nerve cells are particularly sensitive to deficient blood and that the low pressure in itself insures this deficiency. To the theory of fat embolus he gives but a passing allusion. The same may be said of Henderson's theory of acapnea. Cannon refers back to some observations made years ago to the effect that the first products of protein digestion, the proteoses and the peptones, are extremely toxic. If these products be injected into an animal they produce peptone shock and if introduced into the blood stream may cause profound effects upon the blood-vessels. There is a peptone class of lymphagogues which cause such a change in the papillary wall that fluid, the lymph, passes out from the blood in increased amount. Moreover, if tissues are injured they undergo autodigestion, and the reduction is similar to that produced by normal digestion. It is therefore obvious that as the result of injury toxic substances may be produced by local action in the injured tissues, and these substances given off in the blood stream may cause fall of blood-pressure and a greater permeability of the capillary walls, with alterations of the relationship between the blood and the fluids outside the blood-vessels, changes which may be distributed to the entire bodily organization.

In corroboration of this theory it was found that after an extensive injury to an animal's leg blood-pressure began to fall in about twenty minutes and reached shock level in about an hour, where it remained, with no tendency to rise at all. In another animal the blood-vessels of the leg were first closed. Clips were left on the blood vessels for thirty-five minutes after the muscle injury, during which there was no passage of blood into or out of the injured region nor was there any fall of pressure. As soon as the clips were released the pressure promptly dropped to shock level.

In the third experiment the nerves of the leg were cut to begin with. The leg was then injured. The blood-pressure slowly fell. Later on the blood-vessels of the region were tied so that there was no blood connection between the injured area and the rest of the body. The original blood-pressure was slowly regained. These observations seemed to give to Cannon a rational account of the way in which shock is brought about.

It appears to be brought about chiefly by the absorption of toxic materials from injured tissues into the blood stream which carries them about so that they affect all parts of the body. Shock, then, is a general bodily state following a local injury, a toxemia arising from the local injury, and quite distinguishable from it. This secondary relationship of shock to injury is something which has been observed repeatedly

in the course of the war. Stretcher-bearers, regimental medical officers and others have noted again and again that a wounded man will leave the front line in fairly good condition, and only when he gets to the ambulance dressing station, or even farther back, will he be in a state of shock.

In numberless instances it was observed that the phenomena of shock became rapidly progressive and more pronounced from the effect, for instance, of agitating the ends of a broken femur in injured tissues. After the muscle had been damaged and the pressure had gone down slightly, the muscles were further injured by agitating the broken bone. The pressure dropped sharply, and by agitating the bone again the pressure dropped sharply again, and so on.

A number of practical matters arise in connection with these observations. In the first place, advantage is attained from shutting off from the rest of the body a limb which is so badly injured that there is no possibility of saving it—a leg that is so badly mangled, for instance, that there is no possibility of its restoration to usefulness. A tourniquet should be put tightly around the leg, as near the injury as possible, and kept there to prevent the absorption of toxic material which might result in shock, and the surgeon should remove the mangled limb before removing the tourniquet.

There is another practical matter in relation to the tourniquet. Medical officers who have come over from the United States have been told that the tourniquet may be applied but must be released every twenty minutes to let the blood stream into the part and to keep the circulation going. Under war conditions, particularly such conditions as have obtained during the past two or three months, that advice is impossible to carry out. A wounded man has a tourniquet placed on his arm or leg; he is covered up with blankets and put in an ambulance. He may be there twenty-four or thirty-six hours with very little attention paid to him. During that time the blood stream is shut off from the injured part of the limb. The same processes are going on in that limb that are going on in injured tissue; the tissues are dying and becoming subject to autolysis. Now when the man finally arrives at a hospital the surgeon is likely to say: "Well, this is a minor wound; we can save that arm;" and he removes the tourniquet. Cannon has heard of six men who died from shock under precisely such conditions. One man arrived in good condition with a slight wound in the wrist and with a tourniquet on his arm above the elbow. The surgeon thought the wound so slight that there was no reason at all for not cleaning it up and saving the arm. The tourniquet, which had been on for an indefinite time, was taken off, and in about two hours the man fell into profound shock from which he could not be recovered. Dr. Quenu, of the French service, has met similar instances in his experience in the French army. So there are serious dangers which attend the use of the tourniquet if it is left on a long time and then removed.

Another practical point which comes out of these considerations is that if a broken bone is moving about in the injured tissue, it is going to injure the tissue still further. The testimony of surgeons who have had experience throughout the war—who saw wounded men brought back in the early days without splints, and who saw them brought back later properly splinted—has been that the Thomas splint probably had done more to reduce shock than any other agency. According to the evidence it has reduced shock chiefly by lessening the amount of tissue damage arising from the movement of the ends of broken bones in the torn tissues.

It is of some interest to observe that shock is a common accompaniment of gas gangrene resulting from varieties of gas bacilli, and it is interesting in this connection also to observe that all of these bacilli are proteolytic in their action. They cause the breaking up of the protein molecule, and therefore may bring about shock in

the same way that tissue injury may bring it about; in one case there is trauma and autolysis, and in the other bacterial action breaking down protein and liberating toxic material.

There is a secondary factor that enters into the shock complex that is of great importance. That is the low blood-pressure itself. When the blood falls the head of pressure in the arteries, which keeps the circulation going, is incapable of continuing the blood flow at the former rate, precisely because the pressure has fallen. If you fill a tank full of water and let the water run out through a hole at the side near the bottom, the water will squirt for some distance when the tank is full; but the force of the stream becomes less and less as the tank empties and the head of pressure is gradually lost. So in our circulation. The high head of pressure, about 120 mm. of mercury normally, keeps the blood flowing at a rapid rate. If the head of pressure falls, the blood stream runs slower and slower. This implies that the trips which the blood corpuscles make between the lungs and the tissues in a given time become fewer and fewer, and, in turn, that the amount of oxygen carried in the tissues is reduced; and finally, as that process goes on, there comes a critical point at which the oxygen supply is insufficient. When that occurs there is a failure to burn some of the acid products of activity in the body. They are given off into the blood stream and drive away CO_2. If examinations are made, it is found that there is a critical level at which the CO_2 content of the blood plasma becomes reduced.

In a series of 43 cases of shock, it was found that when the systolic blood-pressure was above 80 mm. of mercury, the CO_2 capacity of the plasma was approximately 50 volumes per cent—that is, on the boundary line between normality and acidosis. When the blood-pressure fell below 80, there was a sharp drop—between 70 and 80 mm., 43 volumes per cent; between 60 and 70, 36; between 50 and 60, 24. This drop in the CO_2 content of the plasma indicates acidosis—*i.e.*, the development of non-volatile acid in the blood.

The importance of the acidosis lies in its inner significance—its significance as an indication that insufficient oxygen is being carried to the tissues by the slow circulation. We are all familiar with the fact that tissues differ in their needs for oxygen. Some muscle tissue—that of the intestinal tract, for example—can get along without oxygen for three hours or so; on the other hand, if the blood supply to certain cells of the cerebral cortex is shut off for six or seven minutes, they will be so badly damaged that they cannot be revived. What happens, then, is first that there is a fall of blood-pressure due to tissue injury. It falls to a greater or less degree. If that degree is above the critical level, the pressure may undergo spontaneous recovery. But if the pressure falls below the critical level and the blood stream is very much slowed, then there is further damage, which arises in consequence of insufficient oxygen supply.

If a low pressure exists, therefore—a pressure below the critical level—and it is allowed to persist, a progressive damage results due to the deficient oxygen supply to the sensitive nerve centers which have control over vascular tone. And the lower the pressure falls below the critical level the faster is the damage done, and the longer pressure is allowed to persist below the critical level the greater is the damage done.

If a man has a blood-pressure below the critical level, and if in spite of various measures that are taken, such as rest and the application of warmth, the pressure fails to rise above this level, it must be raised. That can be done in two different ways. The best way to do it is by the transfusion of blood. Transfusion of blood increases the volume of circulating fluid so that the pressure rises; in consequence of the higher head of pressure the rate of flow is restored to normal and oxygen is delivered to the tissues as they need it. But blood not only increases the

volume of circulatory fluid, it also increases the number of carriers of oxygen in the stream. If shock is complicated by bleeding, there is no obvious advantage in using blood.

There is another way, however, in which greater use can be made of the carriers which are present, and that is through the introduction into the blood-vessels of an indifferent fluid which by increasing the circulatory volume causes a rise of pressure. This rise of pressure results in a faster flow, in an increase in the number of trips which the red corpuscles make between the lungs and tissues, and consequently in an increased delivery of oxygen. There are various fluids which have been suggested. Normal salt solution has been very commonly used in the past, but the difficulty with it is that it causes a very temporary rise, and within fifteen or twenty minutes—half an hour at the outside—the pressure is down where it was before. Another fluid which has been used is a glucose solution; however, that also fails to keep the pressure up for any considerable length of time. Professor Bayliss, of London, has advocated a solution of 6-per-cent gum acacia in 0.9-per-cent sodium chloride, the so-called "gum-salt solution." This has been used largely both in the British and American services as a means of raising the blood-pressure, its value lying in the fact that because of its colloidal character it does not escape from the blood-vessels, as does simple salt solution, and therefore causes a permanent rise of pressure. Like blood, it has relatively little value if given late in shock.

Either blood or the gum-salt solution should be given early. If transfusion or infusion is done after the damage to the medullary centers—the vasomotor center, especially—has occurred, no advantage arises from it. If, in an experimental animal, the medullary centers are destroyed altogether, and if blood, or salt solution, or any other compensatory fluid, is introduced into the blood stream, no permanent rise of pressure results. It is like pouring fluid into a sieve. The pressure may rise temporarily while the fluid is going in and may remain high for a little while, but if the medulla has been destroyed the pressure simply falls again to the original level. Precisely the same phenomenon is seen in human cases if a low pressure is allowed to persist for a long time. Obviously, therefore, resuscitation measures in warfare should be carried as far forward as possible, in order that they may be applied early.

There are other measures than transfusion or injection which can be employed to increase the blood volume. The simplest of these is fluid given by mouth or rectum. Water or salt solution taken into the body through the alimentary tract may remain as a permanent addition to the circulating blood. In clinical studies which Major Robertson has made that fact has been exactly determined; in the course of twenty-four hours he has succeeded by this simple means in increasing the circulating fluid by 1500 Cc. That is approximately 33 per cent of the blood volume of a large man.

Other simple measures can be employed in treating shock. One of these, and a most important one, may be associated with a difference in the distribution of blood in the body. Cannon found a remarkable discrepancy between the blood counts in capillaries and veins. Not uncommonly there may be differences of 2,500,000 corpuscles between the venous count from the elbow vein and capillary counts taken at the same time from ears, toes, and fingers. This fact has been confirmed by other observers since. To be sure, these areas comprise only a very small part of the capillary field of the body, but in so far as they are representative they indicate that some of the blood in shock is stagnant and concentrated in the capillaries. Now cold will also produce stagnation and concentration of blood in capillaries. If you make a blood count from one of your hands when it is blue with cold, and compare it with the blood count in the other hand, which you have

kept warm, you will find that the count in the cold hand is much higher than that in the warm hand. So it is quite possible that cold may cause stagnation in shock and may thus increase the state of shock by increasing the amount of blood which is out of circulation.

There is a definite association between the chilling of a shocked man and the degree of shock; if a badly wounded man becomes cold he is likely to go into shock, and when he is warmed up he is usually greatly improved. There are various reasons why a wounded man will get cold. In the first place, he sweats a good deal; that is one of the first reactions observed in a badly wounded man; he begins to sweat profusely. Sometimes the badly wounded will complain more of their sweating than they will of their wounds. Through their wet clothes they lose heat by evaporation and conduction. If the blood-pressure falls to the neighborhood of 60 mm. of mercury there may be a reduction of the heat production of 50 per cent. The man in shock, therefore, is not only losing heat but is failing to produce it. There is every reason for paying particular attention to the warmth of a shocked man. He ought to be protected first of all by proper blanketing so that such heat as he has does not escape. The blankets should be folded carefully underneath and over the man. A man can lose heat through a wet canvas stretcher almost as readily as he can through a piece of sheet iron. There is no reason at all, with four blankets, why a man should not have an abundance of protection against heat loss, both above and underneath. Hot-water bottles also should be applied. When the man reaches a hospital he should be undressed and put to bed. A fracture frame put over him and covered with blankets will permit hot air from a stove-pipe or other source to be led in under the frame to keep him warm.

The warming of a shocked man will sometimes extraordinarily improve the blood-pressure. Cannon has seen a man come into a shock ward absolutely pulseless, and in forty-five minutes, after being warmed, he had a blood-pressure of 110, a very satisfactory pressure. Never try the more complex measures of transfusion or infusion until it has been shown what simple warmth and rest will do. Morphia should be given to quiet a shocked man. It diminishes the activities of the tissues and their demand for oxygen and it gives comfort.

It is well recognized that surgeons hesitate to operate on a shocked patient. The danger Cannon believes is rather incident to the anesthetic than the operation. In a series of cases it was found that the blood-pressure fell from 88 systolic to 32, and from this down to 31. In the CO_2 content of the plasma there was a marked drop. This is likely to happen when shocked men are operated on, and is due in large measure to the anesthesia. In some laboratory studies on shocked animals there was a fall of blood-pressure always when ether was given. When nitrous oxide was used the effect depended in large measure upon the nitrous oxide and oxygen. If in the ratio of 6 to 1 fall was just about the same as with ether. If the ratio was brought 3 to 1 and the same degree of anesthesia obtained, there was no further fall of blood-pressure whatever. From which it seems that nitrous oxide is the anesthetic of choice in shock cases and that it should be given with as much oxygen mixed with it as possible. Shocked men are usually dull, so that they can be operated on in analgesia and not anesthesia. If operation can be done under ether the pressure should be held up by starting transfusion or infusion at the beginning of the operation and continuing it gradually as the surgical measures proceed.

ANESTHESIA.

From the large number of surgical operations called for during the war and after it, and from an intensive study given the various problems having a bearing upon the successful outcome of these operations, it

would seem that there should result a simple systematized and recognized technique of anesthesia, both local and general. There has as yet been no systematized study of the available facts bearing upon this point. In general terms the great safety of nitrous oxide in the hands of a skilled administrator, with its almost complete absence of after-effects, has been widely recognized. Ether has more firmly established itself. Local anesthesia has not been given that impetus which its merits justify, probably because the time element is of such importance that this method is not given an opportunity to prove both its value and its large applicability. An excellent résumé of the general subject is found in the *United States Naval Medical Bulletin, Report on Medical and Surgical Developments of the War,* by William S. Bainbridge, Washington Printing Office, January, 1919.

For the gas-oxygen administration the American Red Cross apparatus is commended both for its simplicity and its efficiency. By the use of needle valves the gases are effectively reduced, the weight, size and cost of the apparatus being at the same time decreased to one-fourth that of any other suitable apparatus. Its weight is estimated at about eight pounds, its cost about $25.

Sight feed (*i.e.*, two tubes immersed in water contained in a glass bottle for the nitrous oxide and the oxygen, respectively, the bubbles made by the gases escaping from the holes in these tubes indicating the approximate percentage) replaces the clock dials and indicators. The first hole in the oxygen tube is approximately 5 per cent by volume of the four holes in the nitrous oxide tube, which is the usual proportion, with only slight variations for individual patients.

Furthermore, only one rubber bag is required, the space in the glass bottle above the water being utilized as a mixing chamber for the gases. There is an ether chamber attached to the sight-feed apparatus which permits of the giving of varying percentages of ether according to the relaxation desired.

The patient is the final index irrespective of apparatus (if cyanosed, more oxygen is needed; if too lightly under, nitrous oxide is indicated); therefore an even flow of gases with an approximate and dependable percentage is all that is necessary. The possibility of breakage is greatly reduced by the fact that the needle valves and sight feed are placed immediately upon the tanks. The gases are conducted from the sight feed by two to three feet of rubber tubing to a rubber bag, which is placed near the patient's face in order to reduce the respiratory effort to a minimum. All authorities are urged that an unnecessary burden would be placed upon some patients if rebreathing were entirely eliminated.

Among the newer methods is that of oral anesthesia introduced by Gwathmey and Karsner. Gwathmey finds that a preparation containing 50 per cent ether in liquid petrolatum or other bland oil, administered by mouth, is a safe general analgesic, has apparently no deleterious effects on the stomach, and is not followed by the nausea and vomiting that frequently accompany inhalation anesthesia. It may be given without unpleasant taste when "sandwiched" between mouthfuls of port wine. The patient does not need to be taken from his bed, thus reducing the pain and the danger of displacing bone fragments before and after dressings, and saving the time of surgeons, nurses, and orderlies. Supplemented by local or light inhalation anesthesia, or a hypodermic of morphine, when necessary, the method is being developed to embrace short surgical operations. While it is well not to give the analgesic immediately after a meal, no especial preparation of the stomach is necessary, and the patient is able to take food and water shortly afterward.

Gwathmey gives a tablespoonful of liquid paraffin and a tablespoonful of ether to which are added a few drops of peppermint water. Marshall, of Guy's Hospital, uses an ounce and a half of ether, 20 minims of

chloroform, and 4 ounces of liquid paraffin, which is given twenty minutes before an operation. The analgesic effect lasts for about forty-five minutes. Marshall employs no hypodermic with this method and declares it to be the only type of anesthesia that may safely be used after a meal. Patients may eat as soon as recovering consciousness. Bainbridge reports that wherever this method was used he heard it spoken of favorably.

The spinal anesthesia by novocain and rectal anesthesia receive but a brief allusion.

The impression gained from this contribution is to the effect that the method of anesthesia most widely accepted is that of preliminary morphinization, followed by nitrous-oxide-oxygen-ether, and furthermore that for the administration of nitrous oxide a very simple apparatus is all that is needful in the hands of one skilled in its use.

REPORTS ON THERAPEUTIC PROGRESS.

CHENOPODIUM IN AMEBIC DYSENTERY.

In the *Indian Medical Gazette* for February, 1919, BARNES and CORT, of Chiengmai, Siam, have published a preliminary report on the value of oil of chenopodium in the treatment of amebic dysentery, as experienced in the course of antihookworm work in Siam under the Rockefeller Foundation.

The patients in the cases reported were ambulant, but suffering from dysenteric stools, with some exceptions. No cases of fulminating amebiasis were treated by this method.

A careful perusal of current medical literature, however, shows that physicians working in tropical countries are apparently not satisfied with emetine. While excellent results have been obtained with it, it is by no means atoxic, and untoward symptoms and even deaths have been attributed to its administration. Moreover, there are cases of amebiasis which fail to respond to the emetine treatment.

In light cases a saline was given before the chenopodium was administered, followed within an hour by one and a half ounces of castor oil. In more severe cases the preliminary saline was omitted, and 2 Cc. of the oil of chenopodium were administered in one and a half ounces of castor oil at a single dose. In other cases the oil of chenopodium emulsified with gum acacia was administered by rectum. In such cases the anal mucosa must be protected with petrolatum, and it is well to terminate the injection with 2 ounces of an inert oil. The buttocks should be elevated, the enema given slowly and with great care, the first dose not exceeding 8 ounces in the adult. This enema should be retained for an hour if possible. If the parts are well protected with petrolatum, the patient does not suffer from the intense burning sensations which would otherwise accompany the expulsion of the enema. In practically every case, after treatment by one of the foregoing methods, there was marked improvement in the condition, as blood and mucus disappeared from the stools on the second day after treatment. In a few instances, as will be noted in the case reports, this improvement was not evident or was only temporary.

After reading Walker and Emrich's article on the effect of oil of chenopodium on amebic cysts, they administered the treatment to two patients in whom cysts were found, with the results indicated in the case reports. In one of these cases chloroform was included in the treatment as recommended by Walker and Emrich, but on account of some unfavorable symptoms Barnes and Cort have not used it in other cases. They reach the following conclusions:

1. Oil of chenopodium relieves promptly the clinical symptoms in many patients with chronic and subacute amebic dysentery.

2. Oil of chenopodium administered by

mouth or by rectum possesses marked power as an amebicide, as is shown by the rapid disappearance of amebæ from the stools, following its administration.

3. There is a tendency to relapse in some cases, but in their series this is not greater than with the use of emetine.

4. The oil of chenopodium may be safely administered, when combined with castor oil in a single dose.

DICHLORAMINE-T AND PETROLATUM DRESSING FOR BURNS.

SOLLMANN, in the *Journal of the American Medical Association* of April 5, 1919, concludes that an ointment of 3 parts of surgical paraffin and 7 parts of liquid petrolatum has relatively little destructive action on dichloramine-T and can be used as a protective dressing on wounds (burns) treated with dichloramine-T-chlorcosane solution, and even as a basis for a dichloramine-T ointment.

Ordinary petrolatum, irrespective of its color, is very destructive of dichloramine-T, and cannot be used effectively in connection with it.

Liquid petrolatum can be used in emergencies as a vehicle for dichloramine-T, although it is inferior to chlorcosane.

Solutions of dichloramine-T in carbon tetrachloride are very stable, while those in kerosene or in olive oil deteriorate very rapidly.

OBSERVATIONS ON THE WASSERMANN REACTION.

LEWIS and NEWCOMER, in the *Journal of Experimental Medicine* for April, 1919, state that the Wassermann reaction carried out according to the method of McIntosh and Fildes, with cholesterolized antigen and with certain allowances for the presence of native antisheep amboceptor, leads to about the same result as when it is done according to the recent proposal of Noguchi, with the native human complement and acetone-insoluble lipoids as antigen. The differences are such as to suggest that from the point of view of diagnosis the Noguchi method is the more conservative, but that there is definite advantage in using two methods as distinct in origin of materials as these, partly for the purpose of control, and partly in the hope of acquiring new information of importance. As a measure of control of treatment the cholesterol antigen appears to them to be the more valuable. The Wassermann reaction alone, by whatever method it may be done, can only be used in the diagnosis of syphilis in conjunction with presumption based on other grounds. That it fails to appear in a considerable percentage of syphilitics is well known; that the reaction is positive in other conditions is not so generally recognized. Fresh instances of this in certain febrile cases are here recorded.

TRAUMATIC SHOCK AND HEMORRHAGE.

In *War Medicine* for December, 1918, it is stated that in shock and hemorrhage a low arterial pressure should be raised, not by damming up the already reduced volume of blood in the arteries—as results from general vasoconstriction—but by increasing the volume of circulating fluid. This is best done by transfusing blood, for thus the rate of circulation is increased by raising the head of pressure in the arteries, and oxygen carriers are also added to the circulating fluid. In the absence of blood the gum acacia solution, devised by Bayliss, should be employed. By increasing the blood volume it raises arterial pressure and accelerates the blood flow. Blood transfusion is the method of choice in treating shock and hemorrhage, and after extensive hemorrhage it is especially urgent.

From the foregoing considerations the following inferences regarding treatment are drawn:

Morphia should be given in sufficiently large doses to keep the patient comfortable and quiet.

Persistence of arterial blood-pressure below 90 mm. of mercury (systolic) for more than half an hour, without sign of improvement, in spite of rest, quiet, warmth, and

fluid, should call for transfusion of blood or infusion of gum-salt solution. If the pressure is much below 90 mm., *e.g.* 50 or 60 mm., such treatment should be instituted immediately. Certain cases in which the blood loss has been extreme may require a second transfusion before a satisfactory condition is reached.

When there is danger of internal bleeding, if the blood-pressure is raised by intravenous injections, start the injection when the surgeon is ready to check any hemorrhage that may result.

Before operation it is best to give a shocked man time to recover both from his low blood-pressure and from the effects of low pressure.

In case of concealed hemorrhage, however, or rapidly spreading infection (*e.g.* gas gangrene), operation may be necessary before such recovery has occurred. Since ether anesthesia is likely to lower an already low pressure, it should be given only as the pressure is being artificially raised. Blood transfusion or intravenous injection of gum-salt solution should be started, under these circumstances, as soon as anesthesia is induced. The pressure may thus be prevented from falling during the operative procedure.

Whether blood for gum-salt solution has been injected or not, the patient should be given large quantities of fluid by the digestive tract for twenty-four to forty-eight hours afterwards.

Transfusion or infusion should be repeated after the operation if blood loss has been considerable, or if any other indication, such as persistent low blood-pressure, appears.

It should be remembered that cases in which low blood-pressure has persisted for a long time may improve only slowly after treatment.

Positive indications for transfusion in secondary anemia, with prolonged suppuration and sluggish wound healing, will be found in repeated blood counts and hemoglobin determinations. Repeated transfusions are often necessary before the desired improvement is attained.

Since the transfusion of blood can be of so much benefit to the recipient, and is so slight a tax upon the donor, surgical officers and officers in charge of resuscitation of surgical patients should realize that, whereas an error of omission may cost a life, an error of commission can cause but slight transient discomfort.

If through unavoidable circumstances a low blood-pressure has persisted for so long a time as to induce an extreme acidosis, indicated by rapid, deep respiration ("air hunger"), intravenous injection of 3-per-cent sodium bicarbonate may give marked and immediate relief. Such treatment should be followed by other methods to raise arterial pressure.

In cases of secondary hemorrhage, treatment should be determined in accordance with the urgency of the patient's condition. With pallor, and small rapid pulse, and blood-pressure below the critical level, transfusion should be given. Less urgent cases may be satisfactorily treated by giving as soon and as rapidly as possible large quantities of fluid by mouth, and salt solution by rectum.

OBSERVATIONS ON BILIOUSNESS.

MILLIKIN in the *Ohio State Medical Journal* for April, 1919, states that there are two prominent theories of biliousness —one, so well championed by the English clinician, Francis Hare, that the liver cells are overloaded with glycogen, and their swollen state interferes with the various functions of the hepatic laboratory; the other, so generally held, that hepatic function is disturbed by nitrogenous waste, and perhaps sometimes by small amounts of certain foods.

Each theory contains a certain amount of truth. It is probable that a therapeutic test might strengthen one of these theories. It has been shown that adrenalin injected in the body stimulates the hepatic ferment which converts glycogen into sugar. If this is remembered a hypodermic of adrenalin solution will be given to the bilious patient. If it improves him quickly, then

one may have grounds for supporting the former theory. If it does not, then one will have some slight ground for faith in the second. Still, it is possible that the administration of adrenalin causes other changes in the liver which aid oxidation of nitrogenous substances.

We all know that those attacks of asthma which come about midnight are, as a rule, relieved by adrenalin. Francis Hare thinks that an excess of glycogen is the cause of these nocturnal disturbances. If the heaviest meal of the day is taken in the evening, and if there is comparative bodily quiet until bedtime, the maximum amount of glycogen is probably stored in the liver at the witching time of night. The hepatic factor is given here not as a theory, but merely as a hypothesis in the production of that medical enigma—asthma. Certain it is that anything which puts a man's liver in good condition is good for his asthma. By walking it off he uses up glycogen. By taking a purge he lessens portal congestion. By making his evening meal a light one he does not crowd his hepatic cells with digestion products.

There is a class of patients who are large eaters and who are logy in the afternoon and evening. They may be ruddy and well nourished, but they suffer from chronic biliousness. Systematic exercise does them good, but if this expenditure of energy creates a desire for more food they may be no better off than before. Still it is better to be active than to dwell on the low plane of sedentary life with a low food ration. Remembering what Lusk has asserted, that cold causes a rapid loss of glycogen, these people should be benefited by gymnasium work followed by a swim in the pool. Bowling, billiards, dancing and evening walks are activities which indulged in with discretion will put the proverbial tired business man in fitter condition for the next day's work than sitting in his easy chair.

The no-breakfast faddists are probably right in their claim that two meals a day are best for the average city dweller. Until recently there have been no scientific experiments bearing on the benefits of fasting. Dr. Carlson, of the University of Chicago, in his recent book "The Control of Hunger in Health and Disease," describes the effects of a five-day fast on himself and a laboratory coworker. These experiments were made to test the motor activity of the stomach during fasting. On the second day after the fast Carlson says he felt about as well as usual. From the second day on the experimenters felt unusually well, distinctly better, in fact, than before the hunger period, although both coworkers were normally in good health and vigor and not hampered by excessive fat. Carlson felt as if he had had a month's vacation in the mountains. His mind was unusually clear and a large amount of mental and physical work could be accomplished without fatigue. In Carlson's own trial, the five-day starvation period increased the vigor of the gastric hunger contractions to that of a young man twenty or twenty-five years of age, and the empty stomach retained this increased vigor for at least three weeks after the hunger period.

While fasting for several days is out of the question for active people, yet this experiment shows the harmlessness and even benefit of it. No doubt we would all feel better if we could accurately gauge the caloric requirements of the body from day to day and take just enough food to meet the demand. Perhaps the war prices on food and the necessity of economy will prompt some one to make little dining-table scales on which we can weigh our rations. The thought comes to us in reading Dr. Carlson's experiment, that we might have stronger stomach contractions if we ate less. This is probably what would happen to one. It has seemed to him that there is a quicker colon response to the ingestion of food when he has been eating a number of smaller meals than ordinary. If his provings are correct, the phenomenon is likely due to the lessened work on the digestive organs.

Nearly everybody believes that constipation is the cause of biliousness. But when we carefully quiz our patients who are bilious, we must generally admit that we find

a large proportion of them who have regular bowel movements. A hard, dry stool is about the most harmless thing that the bowel contains. Nothing makes one feel more out of sorts than to have semi-liquid stools in the bowels, for fluidity is one of the essentials to absorption. Better than intestinal laxatives is what might be termed a renal purge, and the drug for this purpose is simple hot water in glassfuls. After taking three or four glassfuls there is a copious secretion of urine. The importance of retaining this urine in the bladder should be appreciated. "To have and to hold" the urine as long as possible should be the motto of the bilious and constipated. The strong impulses to empty the bladder probably spread to the nerves governing the sigmoid and rectum, and they in turn become active. This is the main way in which copious water-drinking overcomes constipation; for the mere ingestion of large quantities of water hardly modifies the feces at all; and if one urinates frequently the stimulus to the lower bowel from a full bladder is lost.

If one does have a *bona-fide* bilious attack, keep moving, Millikin has at such times tried innocuous desuetude and at others pernicious activity; but the latter gets less pernicious as the day advances, and one does not have a chance to feel sorry for oneself. By evening one is able to appreciate Tom Hood's witticism:

> No solemn sanctimonious face I pull,
> Nor think I'm pious when I'm only bilious.

Unless bilious folk have idiosyncrasies to certain foods they can eat as they like, provided the amount is small. This kind of advice will not please the average patient, who likes to share with the physician the responsibility of dietetic errors, but the physician should put the burden where it belongs.

Drugs are pernicious things in an acute bilious seizure. Mercury is, however, easily worth its weight in gold at these times. Calomel does not increase bile, but it does effect a release of that retained. The public has learned the use of aspirin. This drug, being a derivative of salicylic acid, is a hepatic stimulant, and it is of use in acute hepatic congestion and especially between the attacks. The treatment Millikin advises is to stop eating, take a large enema and a calomel purge, and drink large quantities of hot water.

A CRITICISM OF SOME MODERN METHODS OF INFANT FEEDING.

LAING, in the *British Medical Journal* of February 8, 1919, submits a few notes on a subject of some importance, as the result of long and close observation of the progress of babies in general practice.

The following is approximately the method of artificial feeding adopted by some of the large London hospitals and institutions:

The baby is not fed for the first forty-eight hours after birth; he may be given a little sterile water. After this period the following mixture is used for the first week: Milk (sterile) 1 part, water 3 parts, with sugar about 10 grains and cream 5 minims to an ounce of the mixture. This is given every four hours on the third day, and on the fourth day every three hours from 7 A.M. to 10 P.M. From 10 P.M. to 7 A.M. only one feed is given, making in the twenty-four hours a total of seven feeds. The quantity allowed at each feed is 1½ ounces for the first week, sometimes two ounces. During the second week the mixture is strengthened to half milk and half water, and the quantity is increased to two ounces; the intervals are kept the same.

This method is apparently adopted in all cases irrespective of the size of the infant or his evident appetite. The principle of such feeding seems to Laing to be wrong, in that it is not a good imitation of the way in which a baby or any other young animal is naturally fed. The mixture is probably more or less correct, for it resembles the composition of the mother's milk; but the quantity and the intervals between feeds are in many instances unsuitable, for the following reasons:

(*a*) *Quantity.*—A young healthy infant always sucks at the breast until he is satisfied; in doing this he very often empties it. The amount of milk which can be drawn from a woman's breast is usually about 2½ or 3 ounces, though it may of course be less. It seems unreasonable to give an infant less food than it would get from a healthy mother.

(*b*) *Intervals.*—In the course of a good many years of general practice Laing has asked nursing mothers how long intervals they gave between feeds. The answer is two to two and a quarter hours, perhaps two and a half hours, never longer, for at least the first month, except at night. When asked why they do not give longer intervals, some or all of the following reasons are invariably given: (1) If the interval is lengthened the baby cries a great deal; (2) the nights are bad because the baby does not sleep for many hours at a stretch; (3) the breasts get swollen and painful. These are very sound reasons for not giving long intervals.

From observation of many cases Laing is sure that bottle-fed babies do better, increase in weight and sleep well if the intervals are short. He has often been asked why the baby cries too much, and in nine cases out of ten he has told the mother to give the food more frequently, and the baby ceases crying (provided it is allowed enough). Perhaps it is not realized how harmful it is to a mother to have her baby crying a great deal; she gets bad nights, feels worried, and becomes restless and nervous, and her recovery is very much retarded.

About twenty or twenty-five years ago a great deal was written and said about infant feeding, and it was pointed out that babies were grossly overfed; this was quite true in many instances, for they were given milk and very thick barley water and much sugar and cream, and the food was more or less forced down their throats; but now we have gone to the other extreme, and in consequence a great many infants are underfed and some nearly starved.

No hard and fast rule can be laid down as to the quantity of food an infant should be allowed irrespective of his size, weight, and natural appetite. It is obvious that a 10-pound baby requires more food than one of 6 pounds. He believes also that some babies digest their food more completely than others, exactly as in the case of adults, so that even with babies of the same weight one cannot be sure that they will do well on the same quantity of food.

The method that he advocates is as follows:

(*a*) *Breast-fed Babies.*—The baby is put to the breast from twelve to sixteen hours after birth, and about every six hours after this until the milk comes. If he cries and seems thirsty he is given sterile water. After the milk has come the baby is put to the breast at least every two hours from about 8 A.M. until 10 P.M., leaving him there until he is satisfied, and, if necessary, waking him at the right times. A good supply of nourishment is thus obtained during the day, so that much food is not needed during the night. After 10 P.M. the baby is allowed to sleep as long as he will; he usually has to be fed once or perhaps twice between 10 P.M. and 8 A.M.; after the first two or three weeks a baby will often sleep six or even eight hours at a stretch if he has had enough food during the daytime. In some cases, in which the baby is small and weak and can only take a little food at a time, and wakes and cries within two hours, he is fed every hour and a half for the first seven days, or even longer. As the infant grows older the intervals of feeding can be gradually lengthened as a rule; about the third or fourth month, or sooner, the baby is often on three-hourly feeds, but this depends on the comfort of the mother and the appetite of the baby, and must not be a hard and fast rule.

(*b*) *Bottle Feeding.*—Laing endeavors to imitate nature as closely as possible; the times of feeding are practically the same as in breast-fed infants. The mixture is as follows, subject to variations: For the first two or three days one part milk, three

parts water, cream half a drachm; sugar, half a drachm, to each feed. After this the mixture is gradually strengthened, till at the end of fourteen days it is one part milk, one and a half parts water, one drachm of cream, rather less than a drachm of sugar to each bottle; sodium citrate or sodium bicarbonate may be added. He does not want to emphasize the ingredients or strength of the mixture, or the variations which may be necessary, but to insist that enough must be given to satisfy the infant. The easiest way to make sure of this is to put enough of the mixture in the bottle, let the baby have it from twenty to thirty minutes (the hole of the teat being of a suitable size), and then take it away. If a baby finishes every bottle it is fairly certain that he is not having enough. A baby, like an adult, takes more at one meal than another, and it therefore follows that there should be something left in some of the bottles. He has found that the actual quantity varies very much, as one would expect—a 10-pound baby takes more food than a 6-pound baby, as a rule, though not always. Some babies are quite content on the stereotyped allowance of one and a half ounces for the first week, and two ounces for the second; others need much more. In the second week it is common for a baby to require 3 ounces in some of its feeds, notably in those following a long sleep. If a baby gets nine feeds in the twenty-four hours with an average of two and a half ounces a feed he will get twenty-two and a half ounces in all. This is not an uncommon amount for an 8-pound or 9-pound baby to take, but some will require even more, others rather less.

Many doctors would object that by this method the baby would be grossly overfed, but Laing contends that it is difficult to overfeed a baby, provided the strength of the mixture is right, the hole in the teat is not too large, and the baby is not allowed to suck too long. A baby at the breast takes as much as he wants, and only leaves off when he is satisfied; a baby at the bottle should do the same. If a breast-fed baby gets a little too much he regurgitates the surplus quite easily; a baby at the bottle does just the same. Laing would even go so far as to suggest that if a baby does not occasionally bring up a little food he is not getting enough to eat.

Unfortunately there is a school that teaches that the correct way to feed an infant is to give it a limited amount of food at three- or even four-hourly intervals. Most text-books recommend intervals of about two hours, but nearly all lay down the exact amount of food to be given at each feed, even to within ¼ or ⅛ ounce, which to his mind is absurd. In two works a rational method is advocated: Hutchinson and Stanfield Coller's Index of Treatment recommends that the baby be allowed to suck until he is satisfied, as he will easily regurgitate any surplus, but the amount of food is not mentioned. Twedy and Wrench give the quantity from 1 to 3 ounces at two-hourly intervals; this variation seems to him sound.

A STUDY OF THE FAT METABOLISM OF INFANTS AND YOUNG CHILDREN.

Holt, Courtney and Fales in the *American Journal of Diseases of Children* for April, 1919, reach the following conclusions:

1. The fat of the stools of normal breast-fed infants, according to their observations, averaged 34.5 per cent of the dried weight and frequently was as high as 50 per cent.

2. The soap fat in the best stools predominated over the other forms of fat, averaging 57.8 per cent of the total fat as determined in the dried stool. The average stool of the normal breast-fed infants showed a soap fat of 43.1 per cent of the total fat, as determined in the dried stool, which would correspond to over one-third of the total fat of the fresh stool.

3. The neutral fat in the best stools averaged 15.9 per cent of the total fat; in the average stool the neutral fat was 20.2 per cent of the total fat. The amount of

neutral fat is not affected by the drying process.

4. No constant relation was shown between the percentage of fat in the mother's milk and the percentage of total fat and its distribution in the stool.

5. With a higher total intake of fat, the fat percentage and the soap fat in the stool were somewhat increased.

6. A range of fat absorption from 90.3 to 99.2 per cent of the intake was found in healthy breast-fed infants.

BIRTH INJURIES.

APPLEGATE, in the *New York Medical Journal* of April 12, 1919, states that the actual causes are: (1) Improper application of forceps and delivery by brute force. Forceps were not made simply to pull babies through with, but for a fourfold purpose, viz., slight compression, traction, leverage, and correlation of the diameters and axes of the fetal head with the pelvis. (2) Too great traction on the head with lateral flexion is one of the causes of brachial palsy. (3) Too great compression on the after-coming fetal head in the breech delivery. (4) Faulty manipulation of the arms or legs when in an abnormal position —also undue traction in the axilla or groin with fingers or blunt hook results in luxation, fracture, or paralysis.

He has been informed by *x*-ray men that they are frequently called upon to radiograph infants and young children with brachial palsy who give a history of traction in the axilla with a finger or blunt hook at the time of birth, with no other assignable cause for the palsy.

The first and most important of the preventive measures is accurate knowledge of the shape and dimensions of the pelvis before the beginning of labor. Next, and before the character of labor is decided upon or any manipulation begun, a careful study of the position, presentation, and dimensions of the child, especially the head.

In the moderate degree contractions, *i.e.*, the pelvis with a true conjugate, one or one and a half centimeters below normal or a fetal head slightly above normal, the degree of disproportion is easily recognized by the use of the pelvimeter, after the Stone method, and ability to adjust the head in the pelvis after the Müller method. The most important diameter, if any evidence of contraction exists, is the conjugate. The warning note or time for immediate forceps delivery is upon the following symptoms on the part of the mother: exhaustion, edema, dilated cervix, membranes ruptured, persistent contractions, and no progress. As long as the membranes are intact the child does not suffer; when ruptured, the warning notes are: liquor amnii discolored by meconium, always a bad omen in cephalic presentations; slowing of the fetal heart sound to 120 or 130 beats a minute, from stimulation of the vagus, followed by the weak, rapid, and wobbling heart to 180 or more beats per minute, due to threatened or actual paralysis from compression.

In addition, if the contractions continue and are vigorous, imperfect oxygenation results and a condition of hypercarbonization of the child exists. In the first instance, with membranes unruptured, cerebral compression and interference with the return circulation, the result is intracranial trauma; in the second instance, with membranes ruptured, direct placental compression, and unless promptly delivered, asphyxia results. To minimize the traumatism in the greater degree pelvic contractions, assuming that the child is of normal dimensions, or the pelvis is of normal dimensions, and the fetus oversized, there are four courses to pursue:

First. By restricting the diet, to retard full or overdevelopment of the fetus, by the elimination of fats and carbohydrates as suggested by Prochownik. It is estimated that the weight of the child is from one to two pounds lighter under this diet, and it is none the worse by reason of it. The diet is limited to the last six weeks of pregnancy, and according to Prochownik no unfavorable influence is shown in the mother, nor upon lactation.

Second. Labor may be induced ten or twelve days before term or before the fetal

head is out of proportion to the pelvis, as ascertained by comparative measurements and by manual engagement of the head in pelvis from time to time.

Third. When the fetal head is undersized as well as the pelvis the test of labor may be given, and, failing, instrumental delivery.

Fourth. When in doubt the test of labor at term, and emergency Cæsarian section without instrumental interference, if the head will not engage under the influence of the forceps; and elective Cæsarian when no doubt exists as to the impossibility of delivery by the natural route.

The greatest number of cranial injuries, he is convinced, occur from the application of forceps to the head in a faulty position. The diagnosis of the exact position of the head in the pelvis, with the overlapping of the parietal bones and the partial closure of the fontanelles, is sometimes a difficult matter, nor can it be taken for granted that because the body of the fetus occupies a definite position, the head always conforms to it.

Very often incomplete rotation will be found, as well as excessive rotation, and transverse position of the head, the result of faulty mechanism. If any doubt exists as to the exact position of the head, it is far better to cautiously introduce the gloved hand to ascertain the outline and position of the presenting part and manually rotate it if possible before application of the forceps is made.

If the forceps are applied laterally and the head is incompletely rotated, the result is traumatism of the face on one side, and the back of the head and neck on the opposite side. If the blades lock with difficulty in this position or with the head in the transverse position they should be removed and an investigation made before traction or reapplication is made. Another warning is in regard to the slipping of the forceps, which nine times out of ten is due to the occipitoposterior position or a hydrocephalic head. It is needless to add that the treatment for this condition is manual rotation by the Porter method, and application of the forceps if the natural forces fail.

The preventive measures in the face presentation, if seen early, are an attempt at manual correction; failing in this and in the absence of disproportion, podalic version is required; when disproportion exists Cæsarian section is indicated. If seen late and the head is engaged with cervical dilatation, anterior rotation of the face and forceps delivery will minimize the traumatism and give the best results.

Too great a compression on the aftercoming head and too much traction on the body in breech delivery, with the finger in the mouth, will create greater traumatism than will the application of the forceps with the body lifted over the pubes and the blades applied in relation to the occipitomental diameter of the head; besides, the child will be less liable to asphyxia and to the development of inspiration pneumonia.

Duchenne's or Erb's paralysis, in which certain definite groups of muscles are affected, namely, the deltoid, intraspinatus, and flexors of the forearms, is the result of injury to the fifth and sixth cervical nerves, and can best be averted by the avoidance of traction downward and laterally, with shoulder retention. When traction is necessary, it should be in a direct line with the axes of the outlet.

The previously conceived idea that the Prague manipulations were responsible for this type of paralysis, by pressure from the hand grip in bringing down the arm, was erroneous, and the most that does occur is fracture or dislocation, and the same is true of the leg in breech presentation, when the thighs are flexed on the abdomen, unless care is exercised in bringing them down by the rotary process over the ventral surface of the body, and not over the back. The more Applegate studies the subject, the more he is convinced that protracted labor does greater harm to the child in transit than forceps rationally applied, and that the greatest element of danger is in failure to recognize the varying degrees of disproportion and the faulty application of forceps in an abnormal position.

NEPHRITIS IN CHILDREN.

HILL, in the *American Journal of Diseases of Children* for April, 1919, in concluding his paper, states it is not his intention to discuss in detail the treatment of nephritis, but merely to consider a few of the more important points. The great principle in treatment is to spare the kidneys and to prevent the accumulation of waste products in the blood and tissues. In this connection, diet and the proper use of water play the most important rôles.

Dietary Principles.—The most important constituents of the diet as far as the kidneys are concerned are sodium chloride and protein. It is the particular work of the kidney to excrete these substances or their end-products, and it is their retention that is the probable cause of many of the untoward symptoms in nephritis. As we have said before, it has been attempted to divide cases of nephritis into two groups, according to whether the difficulty of excretion is with salt or with nitrogenous end-products, but this has been found hardly practical, as it is difficult to tell without complicated laboratory procedures whether a case is primarily of a salt or of a nitrogenous retaining type. It is fairly well established, however, that in all edematous cases there is salt retention; therefore it has been his plan to give a salt-free diet to any patient who showed edema. It also seems best, from what is known of nephritis, to keep the nitrogenous intake as low as is consistent with maintaining nitrogenous equilibrium, although it is undoubtedly true that in many cases of both acute and chronic nephritis, in children, at any rate, there is little or no nitrogen retention on a normal protein intake. He believes that it is important to give a fairly large amount of water, provided the child can handle it, as water aids greatly in diluting and in eliminating toxins. This is especially important in acute hemorrhagic nephritis, where there is probably in many cases a bacterial invasion of the glomeruli.

These are the most important general principles of the dietetic treatment. In detail the following may be considered:

(*a*) *Salt.* There seems no good reason for giving a non-edematous case a salt-free diet. In a case with slight edema the use of salt-free butter and the forbidding of any extra salt is usually sufficient; in a markedly edematous case it is best to use as nearly a salt-free diet as is possible. This means salt-free bread, salt-free butter, vegetables cooked without salt, etc. All of the ordinary foods contain a certain amount of salt, as can be seen from table 3, but the small amount contained in most of them does no harm from a practical point of view.

TABLE 3.—SODIUM CHLORIDE CONTENT OF ORDINARY FOODS (UNCOOKED*).

	Per cent.		Per cent.
Mutton	0.14	Oysters	0.52
Beef	0.11	Codfish	0.16
Pork	0.10	Salmon	0.06
Duck	0.14	Halibut	0.30
Chicken	0.14	Eggs	0.21
Oatmeal	0.29	Milk	0.16
Celery	0.25	Cream	0.13
Tomatoes	0.11	Swiss cheese	2.0
Butter (salted)	1.0-3.0	Edam cheese	3.3
Butter (unsalted)	0.02-0.21	Bread	0.18

Most other cereals, vegetables, fruits and nuts contain less than 0.10 per cent.

*It is probable that more than half the salt in many of these foods would be lost by cooking.

It is often remarkable to see how quickly edema disappears with salt-free diet, and in many mild cases no other measures are necessary. In more severe cases, such additional procedures as sweating and purging may have to be resorted to. He has followed the sodium chloride output daily in several of our edematous cases, and below is a table from a case with a great deal of edema in which no other method of treatment was used than a salt-free diet. The disappearance of the edema was rapid in both.

TABLE 4.—R. M., AGED 6; ACUTE "EXUDATIVE" NEPHRITIS; EDEMA EXCESSIVE.

No treatment save salt-free diet.

Date.	Fluid intake, Cc.	Urine, Cc.	Salt output, Gm.
Feb. 18	300	330	1.8
19	300	300	2.0*
20	300	510	4.5
21	600	410	1.5
22	600	410	1.4
23	600	450	1.3
24	600	460	1.2
25	600	585	1.8

*Two pounds loss in weight, on the first two days of salt-free diet.

(*b*) *Protein.* There are still many writers who advocate a very much restricted diet in every respect for patients with acute

nephritis, but Hill sees no reason why a child with acute or with chronic nephritis should not have as much fatty and carbohydrate food as he wants, with just enough protein to cover his nitrogen needs. As a matter of fact, there is no good proof that protein does harm in every case of nephritis, but it certainly may in many cases, and inasmuch as it is quite impractical to determine in each case the power of the kidney to excrete nitrogenous waste products, it is only reasonable to cut the protein intake in every case to the minimum which is necessary for the needs of the body. Much work has been done on the minimum protein requirement for adults, but very little investigation has been made with children in different stages of growth. It is generally well known that children need more protein per kilogramme of body weight than adults do, but probably 1.5 to 2.0 gm. of protein per day per kilogramme of weight is enough for most children to keep in nitrogenous equilibrium. In practice it is usually sufficient to omit meat, eggs, and fish from the diet, and it is not necessary to calculate calories or grammes of protein, although this is usually done in hospitals.

FACTORS AFFECTING THE ANTISCORBUTIC VALUE OF FOODS.

HESS and UNGER in the *American Journal of Diseases of Children* for April, 1919, in their summary of this subject state that numerous reports show that during the late war there was considerable scurvy among the troops of the various armies; least of all along the western front. The scurvy was mainly of the latent or subacute variety and influenced the character of some of the infectious diseases, and may well have been a factor in the congelations occurring among the soldiers in the trenches. It is evident also that scurvy prevailed among the civilian population to a degree far greater than in peace times.

In infants the question of scurvy centers about the milk supply. An infant requires fully one pint of fresh raw milk daily to protect it from this disorder. If the milk is pasteurized, or stale, or heated for a second time, or rendered more sensitive to deterioration by means of an alkali—and particularly if more than one of these influences are operative—more than a pint is needed. The fact that there is an inverse relationship between the amount of milk consumed and the tendency to scurvy shows that we are not dealing with an exogenous toxin and argues in favor of the disorder being primarily a deficiency disease.

Milk does not necessarily lose its antiscorbutic value in the course of drying. If it is dried rapidly, even at a temperature of about 240° F., it retains sufficient of the protective factor to have curative value, provided, naturally, that it was fresh at the time of drying. In considering the question of destruction of this "vitamin" by heat or by alkali, the duration of exposure to the detrimental influence is of the greatest importance.

Babies fed on pasteurized milk should receive an antiscorbutic from the time they are a few weeks of age, as there is no reason for allowing the negative balance of "vitamin" to continue for a longer period. A small amount of orange juice will answer the purpose, and is potent for a period after alkalinization. Its value does not reside in its laxative properties, nor in its salt content, as "artificial orange juice" has practically no therapeutic effect.

If orange juice is filtered, boiled, and rendered faintly alkaline it may be given intravenously without causing any slightly untoward reaction. In this way a very prompt cure can be accomplished. From a pathogenetic view-point a result obtained by this route is of interest as demonstrating that scurvy can be counteracted by a therapy acting quite apart from the alimentary tract.

Diuresis and catharsis do not play an important rôle in the cure of scurvy, as they may be stimulated to a high degree without alleviating the symptoms. This fact argues against regarding this disorder as essentially toxic in nature. It was found also that giving an antiseptic (sodium benzoate) was without effect.

Dehydrated vegetables were ineffective in two instances in which an equivalent amount of fresh vegetables brought about a cure. It is not to be inferred from this result that dehydration necessarily destroys this "vitamin." In this connection too much attention has been paid to the degree of the heating process, and too little to the more important factors—the age of the vegetables, their freshness previous to dehydration, their manner of preservation, etc.

For almost a year strained canned tomatoes have been given, in place of orange juice, to a large number of infants. This substitute has been found a very effective antiscorbutic, and is well borne by babies a few weeks of age. It has the advantage of low cost and availability, and therefore is of particular value for the infants of the poor.

THE ABUSE OF CATHARSIS IN INFANCY AND CHILDHOOD.

FISCHER, in a paper read before the Section on Children, American Medical Association, Atlantic City, June, 1919, pointed out that the daily administration of laxatives and correctives to infants and children is a common practice amongst many mothers and nurses. This is well known to most physicians. Indiscriminate drugging to cleanse the intestinal tract and empty the liver is a daily routine, and this abuse is founded on the enormous amount of advertising matter which impresses the laity with the necessity for so doing. This practice is so common that it is rare to hear of infants or children whose bowels functionate normally. Drugs and correctives are used without any rhyme or reason to suit the whims or ideas of the person in charge of the infant. It is not an exaggeration to speak of this as an abuse of catharsis in children.

The daily use of drugs to stimulate the internal secretions and cleanse the gastrointestinal tract is necessary in acute febrile conditions. It is indicated in toxic and septic conditions. It is also indicated in traumatic conditions and emergencies. It is well known that many glands lose their functional activity during fever, and we can stimulate their function by catharsis. Stagnant residue and fermenting particles of food require elimination. This is especially true in intestinal intoxication accompanied by fever caused by excessive fat or protein feeding. In this class of cases the subnormal condition caused by the fever demands especial attention.

Attention is invited to the infant or child who is given a daily laxative to modify constipation, obstipation, or coprostasis as a routine practice, instead of modifying the diet and adapting the same to correct the condition.

It does not require deep research to understand that by the constant use of laxatives, functional activity of the intestinal canal will soon be impaired, that the tone will gradually be lost. Peristalsis can be stimulated and aided in many other ways than by drugs.

While we may attain the object of cleansing and eliminating fecal particles we frequently interfere with the normal process of digestion and assimilation and deprive the system of nutrition intended for growth.

Fischer believes that excessive purgation weakens the glandular functions and robs the system of ferments and enzymes necessary for the proper assimilation of food, and thus indirectly inviting rickets and weakened structures due to faulty metabolism. Thus it can be seen that instead of doing good by the continuous daily laxative dose of cathartic medicine we do harm thereby, besides lowering the ability of the digestive tract to functionate as it should in health.

Rachitic atony of the musculature simulates constipation. The stagnant fecal contents can only be propelled by stimulation of the gut and restoring the needed tone. It is in this class of cases that cod-liver oil is so efficacious.

The well-known results of thyroid therapy in sporadic cretinism, and the specific action on the constipation accompanying this disease, need no emphasis. The ad-

ministration of one-quarter grain thyroid three times a day, gradually increasing the same until 1 grain is given three times a day, has acted beneficially in quite a number of cases.

The daily administration of a warm soap-water enema should also be condemned. The warm water relaxes the muscles of the intestines, and if persisted in will produce an atony of the intestine with a tendency to prolapse. A cold enema, temperature of 60° to 70°, has a stimulating and tonic effect. Not more than one pint is given at bedtime, or before the second morning feeding.

The importance of water in the diet is not sufficiently emphasized. Fresh cool water will aid in eliminating residue if given between meals several times a day. Water added to the food is not sufficient.

For the older child, the mechanical stimulus in the atonic gut can be given to food by the addition of bran to cereals or by the use of figs, raisins, or whole-wheat bread, and the coarse cereals such as oatmeal. Vegetables such as chopped spinach or chopped string-beans—the green vegetables rather than the starchy cereals, such as potato—should be given.

A PNEUMOTHORAX PARADOX.

Coley, in the *British Medical Journal* of March 15, 1919, states that there is a fact very familiar to all who have experience in the treatment of phthisis by artificial pneumothorax which will probably appear very surprising to other clinicians. It would naturally be supposed that, when one lung is put quite out of action by the induction of pneumothorax, the patient would be very short of breath. Curiously enough the opposite is ordinarily the case. Coley was very much struck with this in a recent case of his own. The patient, a girl of sixteen, had signs of extensive cavity in the left upper lobe, with abundant crepitations in the lower lobe. Some weeks after the induction of a left-sided pneumothorax she remarked to him quite spontaneously: "When I came to the hospital it was all I could do to get up-stairs; now I can go up-and down-stairs quite easily."

The same thing is conspicuous in a patient in the Royal Infirmary, Newcastle-upon-Tyne. On admission she was able to walk but little on account of shortness of breath. Great improvement followed the induction of artificial pneumothorax on the left side. Some time after this she was allowed to go to a concert which was held at Christmas-time in one of the wards. When he asked her if she had breath enough to laugh, she replied with a very pleasant exhibition of her capability in that way.

These instances are given merely to show what an ordinary experience is in successful cases. The explanation of the paradox is, no doubt, that the dyspnea in phthisis is not mainly mechanical and due to the amount of the lung tissue which is disabled by structural disease. This is the case to some extent of course. But the dyspnea is mainly toxic. The same thing has been generally recognized by clinicians in pneumonia. A patch of consolidation in that disease may produce a degree of dyspnea quite out of proportion to its extent. And conversely, when the crisis takes place the dyspnea quickly abates, although physical signs may still show that a large part of the lung is not yet capable of functionating.

That an artificial pneumothorax does have the effect of reducing the output of toxins is proved by the fact that in a patient whose temperature has continued high in spite of prolonged rest in bed it may become normal within a few days of the introduction of air or gas into the pleura.

Coley desires to give prominence to this effect of artificial pneumothorax in relieving shortness of breath because he apprehends that many practitioners, having patients with advanced phthisis afflicted with severe dyspnea, are deterred from considering the induction of a pneumothorax by the fear lest the distress of the patient should be aggravated by it and the fatal termination precipitated. So far from this fear being well grounded, the truth is

that provided the case is otherwise suitable for treatment of pneumothorax, that very dyspnea which was thought to be a contraindication is really a condition which is capable of being relieved to a degree which cannot be expected from any other method. And it may be added that the more extensive the disease, in the lung which it is proposed to compress with air in the pleura, the less will be the strain of extra work thrown by the pneumothorax on the other lung. To immobilize entirely a lung which is already almost incapable of function is physiologically a *vile damnum;* but from the point of view of restraining the output of toxins it may be an enormous gain.

DIPHTHERIA CONTROL.

The *California State Journal of Medicine* for May, 1919, says that the importance of preventive medicine is receiving just appreciation in all departments of medicine. Nowhere is this better exemplified than in the case of diphtheria. Here is a disease with a fearful mortality and serious sequelæ, which is largely curable when properly treated, and entirely preventable by proper methods. In New York City since the introduction of antitoxin, the diphtheria death-rate has fallen from 130 to 20 per 100,000 population, and the incidence has fallen 30 per cent. The incidence and death-rate were highest in children of preschool age.

Certain definite and well-supported measures are recommended by Dr. Wm. H. Park of the New York Department of Health. Especially in institutions children should receive the Schick test for diphtheria susceptibility. Park found susceptibility by ages to be as follows:

Under 3 months	15 per cent susceptible.
3- 6 months	30 per cent susceptible.
6-12 months	60 per cent susceptible.
1- 2 years	70 per cent susceptible.
2- 3 years	60 per cent susceptible.
3- 5 years	40 per cent susceptible.
5-10 years	30 per cent susceptible.
10-20 years	20 per cent susceptible.
Over 20 years	15 per cent susceptible.

Those who are found susceptible by the Schick reaction should then be immunized by hypodermic administration of a toxin-antitoxin mixture, which is as effective as typhoid vaccine against typhoid fever. This injection is harmless, even in infants. One injection immunizes 80 per cent of susceptibles. Two injections immunize 90 per cent and three injections 97 per cent. Immunity lasts at least for three years.

These methods are applicable in schools and ought to become a valuable part of the campaign against diphtheria. Prevention is cheaper and more scientific than cure. When prevention fails, in the case of diphtheria, antitoxin should be used early and in large doses. Usually a hypodermic administration of 0.3 Cc. is safest, and if no reaction ensues, follow in one hour with the total amount. An adult should receive 20,000 units. If the preliminary dose causes reaction, a series of doses at one-hour intervals, graded according to severity of reaction, are necessary to detoxify.

It is impracticable to diagnose diphtheria carriers on a large scale by culture. Identification of susceptibles by the Schick reaction and their immunization by a partially neutralized diphtheria toxin is the best procedure.

SERUM FOR INFLUENZA AT A UNITED STATES NAVAL HOSPITAL.

KENNEDY in the *United States Naval Medical Bulletin* for April, 1919, states that the ordinary methods of treatment were most unsatisfactory. Despite the very best nursing and other therapeutic measures, the death-rate assumed startling proportions.

After giving the usual methods of treatment a trial with unsatisfactory results, they were abandoned, and the employment of "immune serum" was resorted to with happy issues, manifested by a marvelous reduction in the death-rate. In fact, but three deaths have occurred in this hospital since the serum treatment has been employed.

The serum employed was obtained by bleeding patients recovering from influenzal pneumonia during their first week of convalescence. It was taken in 0.2-per-cent sodium citrate solution to prevent clotting

and allowed to stand until the cells settled. Then the serum was taken through a pipette and kept in a container until needed.

It was given intravenously in 100-mil dosage every eight hours until the temperature was normal or other satisfactory signs of improvement appeared. Some cases promptly returned to normal temperatures within twelve hours following the injection. Others had two doses administered, and a very few required three.

The marked change in these serumized patients from the prostration and toxemia which characterized the pneumonic state to general improvement has been most remarkable and satisfactory.

At one time there were eight serumized pneumonic cases from two to five days old in the disease, and all of them with normal temperature and no subjective symptoms of the disease.

During the epidemic 568 cases were admitted. One hundred and fifty-seven of them developed pneumonia, of whom 31 died, a percentage of 20. Of those cases of pneumonia not treated with serum, 28 died, a percentage of 25. Forty-six cases were treated with serum and three died, a percentage of 6.5.

OBTAINING BLOOD IN INFANTS FROM THE LONGITUDINAL SINUS.

SHAW, in the *Albany Medical Annals* for March, 1919, emphasizes the fact that the small size of the veins in infants renders it very difficult to secure blood for diagnosis and to utilize the venous system for therapeutic purposes. It is practically impossible to obtain blood from the veins of the forearm. The external jugular is used very frequently, but presents some difficulties in inserting the needle on account of the flexibility of the vein. Some men prefer the temporal vein, which becomes prominent when the baby cries.

Marfan, a French pediatrician, in 1898 described a method of entering the longitudinal sinus through the anterior fontanelle. Only within the past few years has this procedure been used in this country, and it is now very generally employed.

Anatomically this is an ideal spot to puncture a vein. The longitudinal sinus extends from the frontal bone posteriorly directly in the center of the skull. It is situated in the falx cerebri and covered with the dura mater. It is triangular in shape, growing larger as it extends posteriorly. It is about 3/32 inches in diameter at the anterior angle of the large fontanelle and 4/32 inches at the posterior angle. At the posterior or small fontanelle it is 6/32 inches in diameter, but as this fontanelle is closed a few weeks after birth it cannot be utilized. The anterior or large fontanelle does not close until about the eighteenth month, and in cases of rickets and syphilis it remains open for many months.

The technique is simple. The scalp over the anterior fontanelle is shaved and washed. Iodine is applied and the needle inserted about one-fourth of an inch from the posterior angle of the fontanelle. The distance to the sinus averages about one-fourth inch. The best needle is 18 gauge with a 45° point. A special needle has been devised with a shoulder one-fourth inch from the point in order to prevent it being inserted too far and transfixing the sinus. About four inches of rubber tubing connects the needle with a Luer glass syringe, and a small piece of glass tubing is inserted about an inch from the needle. This makes it possible to see the blood when the sinus is reached if gentle suction is made with the syringe. The baby's head is firmly held by one assistant while a second assistant manages the syringe. Helmhotz of Chicago has devised a head clamp which eliminates one assistant. The needle is inserted posteriorly at an angle of about forty-five degrees directly in the longitudinal axis of the skull. When this has been reached a sense of lessened resistance is felt similar to the entrance of the needle in the spinal canal when making a lumbar puncture. The assistant makes slight suction with the syringe, and if the sinus has been entered the blood will be seen in the eyelet of the tube. The desired amount of blood can be withdrawn. The needle is then removed, and after pressure for a few moments the puncture point is sealed with collodion.

This procedure is useful not only for the purpose of withdrawing blood for diagnosis and venesection, but is the best route for direct transfusion of blood in cases of hemophilia, hemorrhages, etc. The injection of solutions of glucose and normal salt solution in acute marasmus, of bicarbonate of soda in acidosis, of salvarsan in syphilis, etc., have all been made by this method with excellent results. The pain is very slight and no local or general anesthesia is necessary.

If we find that the Wassermann reaction is positive, the question will then arise as to the best method of administering salvarsan. Fisher of New York has introduced salvarsan through the sinus in over fifty cases without any bad results. Dunn, of Boston, on the other hand, has had some fatalities from the injection. There is a possibility of transfixing the sinus and having some of the fluid penetrate into the brain with resulting abscesses, so that if this method is employed it must be used with great caution.

THE TECHNIQUE OF RADIUM APPLICATION.

QUIGLEY (*Minnesota Medicine*, March, 1919) states that the most important thing in radium technique is the amount used and the percentage of purity. The specimen should be 60 to 90 per cent pure and an amount of at least 50 mg. radium element should be used. Next in importance is the screening used and time applied and the distance the radium is placed from the diseased area. In the technique of radium there are two general methods of use: The divided dose method in which relatively small doses of the rays are used over long periods of time, the object being to destroy the disease without producing a burn. The second method is called the "massive dose" method, in which the effort is made to kill the disease at once, with a large dose of rays, disregarding the burns altogether.

The burns from radium are benign. They never result in cancer, and unless some irritant is present to keep the sore open they always heal in a reasonable period of time. This being the case there seems to be no reason for dragging a treatment over months or years and taking the chance of the cells developing an immunity to the rays or a stimulation of the growth resulting from small dosage. Quigley has always followed the "massive dose" method, disregarding burns in every case except where hollow organs, or blood-vessels, or special sense organs, might be broken into. The surgeon does not hesitate to cut deep and wide because of fear that the wound will not heal. The radium operator should not hesitate to use a dose sufficient to destroy the disease he seeks to conquer.

In considering dosage we may take the skin as the standard, and as skin differs in thickness, nerve supply, etc., the average skin of the chest or abdomen may be designated. If, then, we consider the burn we get from the application of 100 mg. radium for ten hours encased in 1 mg. silver, 1 mg. rubber, and 1 mg. of gauze, each tube so encased and each tube containing 25 mg. 60-per-cent pure radium salt, this will represent the maximum dose such a surface would stand without destroying the skin through its entire thickness, and which would heal in a reasonable time, and not leave adherent scars. Taking this as a standard and arbitrarily calling it 100 units we may compare the different parts of the anatomy usually exposed to radium rays as follows:

Skin of surface, 75 units.
Skin of scalp, 125 units.
Skin of groin, 65 units.
Skin over buttocks, 125 units.
Skin over fascia lata, 125 units.
Skin over ear, 60 units.
Skin over eyelids, 80 units.
Eyeball, 80 units.
Mucous membrane of lips and cheeks, 50 units.
Mucous membrane of tongue, 70 units.
Mucous membrane of rectum, 20 units.
Mucous membrane of urethra, 10 units.
Mucous membrane of larynx, 70 units.
Mucous membrane of bladder, 25 units.
Wall of uterus, 300 units.
Buried in tissues: bone, 300 units; muscle, 200 units.

It will be seen that Quigley considers the eye nearly as resistant to radium as the skin, and the uterus the most highly resistant of any organ.

Embedded in tissue the action is not so severe as on the surface. The reason for this is probably because in a case in which the radium is buried the surroundings are practically aseptic, while on a surface or hollow organ there are more or less micro-organisms to attack the tissues.

In passing to pathology we find carcinoma the most resistant tumor we have to deal with. A 50-mg. tube will kill carcinoma cells for a distance of 4 cm., if left sufficiently long. Larger quantities will not do much, if any, better as regards distance, but will accomplish the same result in a shorter time. Sarcoma is probably twice as radiosensitive as carcinoma, the lymphosarcoma being extremely radiosensitive. Fibroma and myoma are perhaps the most radiosensitive, a tumor the size of an eight months' pregnancy disappearing in four months' time after forty hours of treatment with 75 mg. of radium. Pedunculated fibroids respond as well as others if cross-fire is used. Angioma responds to treatment very readily, but in children the tumor is more radiosensitive than in the adult.

On the same basis of computation as we used in comparing histological differences we may adopt 100 units as the dose for a skin carcinoma extending as deep as the deepest layers of the skin, of a size that could be just covered by the tubes in question.

Proceeding then to other pathological conditions he makes comparisons as follows:

Carcinoma of skin ¼ inch deep, 100 units.

Sarcoma (round cell), 50 units.

Angioma (adult), 50 units.

Angioma (child), 25 units.

Fibroma and myoma, 10 units.

T.B. (lupus), 40 units.

Melanoma, 100 units.

Lymphosarcoma, 30 units.

These comparisons are made on the basis of the tissue being the same thickness, and are not taken as practical examples but solely for the purpose of illustrating the difference of radiosensitiveness in different pathological tissues. For instance, a given dose of radium rays will destroy fibroid tissue ten times as far as it will destroy carcinoma, while angioma, sarcoma and tuberculous lesions are approximately twice as radiosensitive as carcinoma. Melanoma is about the same as carcinoma, and this is not to be wondered at, for the modern trend of opinion is that these tumors are carcinoma. In practical work heavy screening should be avoided as much as possible except to protect normal tissues, as beta-rays are probably very important to secure the best results. Accurate approximation is another very important feature. Quigley has seen a couple of radium tubes stuck carelessly into the vagina for cancer of the uterus without any regard to the accurate approximation of the diseased area with the tubes. Such methods can only bring bad results. The tube in these cases must be placed clear to the fundus and the whole uterus rayed; 5 mg. to 75 mg. covered with ½ mm. silver and 1 mm. hard rubber, and used for seven to eight hours in a week or ten-day period, will give the best results. The cervix should be cross-fired by tubes placed horizontally against the cervix at the same time that the tube is inside the cervix.

In dealing with radium the fact should be always borne in mind that light decreases as the square of the distance. For instance, a tube 1 mm. from a diseased spot will give a certain dose. Place the tube 10 mm. from the surface and give it the same time, and we will not get one-tenth the dose, but one-one-hundredth the dose given in the first instance. In other words, to get the same dose at 10 mm. distance the time would have to be 100 times longer than at 1 mm. distance.

A good deal of misunderstanding and confusion in the matter of radium technique has arisen because of comparing radium with the *x*-ray. It is well that the student of radium understand that these two agents are different, physically and in physiological action. It would be just as logical to compare arsenic with cane-sugar, because they are both white, as to compare

x-ray with radium because they both light up the fluoroscope.

A volume would be necessary to properly discuss radium technique. In the hands of one who understands the element and the pathology it is an agent capable of great good. In the hands of one who neither understands the radium nor the pathology the results may not only be negative but harmful.

POSTINFLUENZAL ALOPECIA.

AYRES, in the *Boston Medical and Surgical Journal* of April 24, 1919, states whether the alopecia following influenza is due to toxins or circulatory disturbances, the fact remains that the best means of favoring a new growth of hair is to favor the circulation of the scalp to the best of our ability. New hairs are produced by the oxygen and other nutritive materials which are carried to the scalp by the blood stream. Lotions, ointments, massage, electricity, ultra-violet light—whatever method is employed, the object is the same, namely, to stimulate the circulation, to produce hyperemia, to bring blood to the surface that the hair follicles may be nourished, and the epithelium stimulated to healthy growth. Some of the stimulating agents, such as resorcin, or bichloride of mercury, or electricity, may have a certain amount of direct stimulating effect upon the cells themselves, but probably by far the greater effect is by a stimulation of the circulation. Of course, the scalp should be kept clean and free from dandruff. With Walsh's view in mind, it would be desirable to examine the condition of the circulation, and if any heart damage is found, to institute cardiac hygiene. And with MacLeod's findings in mind, it would be well to warn the patient against wearing a hat more than necessary (this the patient is liable to do to cover up his baldness) and to insert paddings under the hat-bands at appropriate places, according to indications.

Massage is one of the most efficient and inexpensive means of stimulating the circulation of the scalp. This should be practiced several times a day for five or ten minutes at a time. The head should be held down so that the blood will gravitate toward the scalp, then the whole scalp should be grasped with both hands and rolled or kneaded, not simply rubbed.

White believes that the medicinal treatment should vary according to the presence or absence of dandruff in the patient's scalp. He shares the view of a number of other prominent investigators, namely, that most cases of premature baldness are due to seborrhea or dandruff, and that this condition in turn is caused by a microörganism, the "bottle bacillus" of Sabouraud or the micrococcus of Unna. With this in mind he deems it advisable to treat the dandruff when it complicates postinfluenzal alopecia by the following means:

Ointment A.

Sodium biborate, 0.25;
White wax, 3.5;
Sulphur, 3.5;
Water, 7.8;
Oil of rose geranium, q. s.;
Liquid petrolatum, 19.5.

Sig.: Apply one night a week, followed in the morning by a shampoo.

Wash A.

Mercuric chloride, 0.25;
Euresol procapillis (Bilhuber), 8.0;
Spts. formic acid, 30.0;
Castor oil, 0.8;
Alcohol, q. s. ad 240.0.

Apply three mornings a week. To be used in conjunction with Ointment A.

If the scalp is not inflamed, and if there is no dandruff to speak of, the following lotion is very useful as a rubefacient, with possibly some direct stimulating effect on the hair due to pilocarpine and quinine:

Wash B.

Pilocarpine nitrate, 0.06;
Quinine sulphate, 0.6;
Tr. cantharides, 12.0;
Tr. capsicum, 12.0;
Alcohol, q. s. ad 240.0.

Apply three mornings a week.

He cannot agree that all cases of dandruff are due to a superficial infection of the hair follicles, nor that the majority of cases of premature alopecia are traceable to that cause. As we all know, the epidermis over the entire body is in a state of continual physiological exfoliation. Clean people bathe daily or on alternate days, hence wash away these scales faster than they can accumulate, and what is not washed away is

rubbed away by the clothing. In the scalp it is different. We wash our heads once in one, two, or three weeks. Is it any wonder that the normal exfoliation scales accumulate, enmeshed as they are by the hair? Of course a scalp which is excessively itchy, red, and inflamed, and covered with scales is pathological and undoubtedly the seat of an infection, but this is not the picture of the average scalp with slight dandruff.

Diffenbach and many others claim excellent results in the treatment of alopecia by use of ultra-violet light.

Complete regrowth usually takes place gradually after most febrile disorders. On the other hand, more or less alopecia may remain permanently. This may be due to impaired general circulation from a snugly fitting hat in a scalp already weakened by disease, according to MacLeod. Possibly either or both or still other factors operate.

MODERN SURGICAL TREATMENT OF ACUTE EMPYEMA.

FREEMAN, in *Colorado Medicine* for April, 1919, states that the old treatment, established long ago and universally practiced, was to drain every case of infected pleural exudate as soon as infection was established, and in general this worked well.

When we attempted to apply this treatment, however, to the pleural exudates occurring in the epidemics in the cantonments, it failed, much to our surprise. The mortality was enormous.

After a period of discouragement and high mortality, it was discovered that much better results were obtained—in fact, surprisingly good results—by aspirating the fluid at intervals for a number of days, until it had time to change from a thin, cloudy, infected fluid to a real pus, and then, and not until then, operate and drain, as of old.

How can we explain these changes in treatment? Were we mistaken in our older ideas? Or has a new form of empyema developed, requiring a new form of treatment?

This question caused much confusion for a time, but the explanation finally appeared. It is this: The majority of the empyemas occurring in the cantonments were not uncomplicated empyemas, but were empyemas in conjunction with a septic form of pneumonia. Hence the operations were really done upon individuals suffering with pneumonia as the principal disease, and with empyema on the side, both literally and figuratively speaking.

It is easy to see why such operations were disastrous: First, owing to the shock of an operation to a system already overburdened by pneumonia and sepsis; and, second, which is the principal reason, because the opening of the chest produced an acute pneumothorax.

And why should a pneumothorax be disastrous? Because (1) the breathing space of the patient is already limited by the pneumonia, and a pneumothorax increases this limitation by collapsing the lung; (2) the pain following the operation limits the breathing capacity still further; (3) the mediastinal diaphragm has no support, which permits it to "flutter," as it were, and hinder the work of the other lung; (4) this same instability of the mediastinal diaphragm interferes with the action of the heart and disturbs the much-needed circulation. Hence the patient becomes cyanotic, his sepsis increases, his circulation decreases, and he dies.

Are we then to discard open operation and drainage altogether? Not at all. A time comes presently when the pneumonia subsides and the fluid in the chest turns from a sero-fibro-purulent one to real pus. Then is the time for operation and open drainage: first, because it relieves the patient of a lot of septic material; second, because the lung is permitted to expand, thus avoiding the formation of a permanent cavity in the chest, which is notoriously difficult to cure; and third, because experience has shown that an operation is then safe.

To sum up the situation: Our old treatment of empyema was right when used in appropriate cases; but we have recently learned that it must not be employed in cases complicated with pneumonia until after the pneumonia has subsided.

But the complication of pneumonia is not always easily recognized, as has been emphasized by Sewall. Hence, if any doubt exists, it is better to go cautiously, with repeated aspirations, and not operate until the situation is clear.

If it is dangerous to operate in the beginning in pneumonia cases, what is the necessity for aspiration? Why not let the fluid in the pleural cavity alone? The answer is easy—aspiration does several things: it allows the lung to expand and relieves dyspnea; it removes a definite quantity of toxins and thus decreases sepsis; by lessening pressure against the mediastinal diaphragm it removes embarrassment of the heart and circulation; and in a certain number of cases, where the infection of the fluid is not too pronounced, recovery results without the necessity of operating and without adhesions of the lung in positions detrimental to its function.

Another change from our older form of treatment has also taken place, although of less importance than the one just discussed. We were formerly taught not to irrigate the pleural cavity after an operation, because it did no good and because it might increase sepsis and give rise to embarrassing reflex symptoms or even to dangerous emboli. Experience in the cantonments has proven, however, that irrigation when properly done may be of advantage, even though not always necessary, in that it may decrease sepsis, shorten convalescence, and even permit of the early operative closure of the chest without drainage.

How are we able to do this now, when it could not be done before? The explanation lies in the proper use of Dakin's solution. Freeman says advisedly the proper use; because if improperly employed it is worse than useless. Its proper employment requires the greatest care and vigilance, and should not be undertaken by those lacking adequate experience.

The question presents itself: Should our old method of the early operative treatment of empyema be completely discarded, or are there still cases in which it should be employed? The answer is that there are many such cases. In fact, we usually should operate early when we are sure that the empyema is primary and that no pneumonia or other debilitating complication exists.

In conclusion, would it not simplify the situation if we were to limit the term empyema to the existence of actual frank pus in the pleural cavity, as it should be limited, and speak of the more watery serous, serofibrinous and sero-fibro-purulent exudations which precede the formation of true pus as pre-empyemic stages of the disease? If we did this we should avoid confusion, and our old rule would still apply—to do an open operation in most cases of true empyema.

PNEUMONIA AND EMPYEMA.

SCHORER, and his associates, in the *Medical Record* of April 26, 1919, conclude:

1. That pneumonia of three types—lobar, broncho-, and combinations of the two—during the recent epidemic was observed. Many of the cases were what MacCallum, Cole, and their coworkers have called interstitial bronchopneumonia, but of these very few followed measles or other contagious diseases.

2. Empyema was the most frequent and serious complication. Of 181 pneumonia patients whose sputum was examined, 81 had fluid in the chest, and of these 56 had a purulent pleural exudate.

3. Hemolytic streptococci were found in 51.9 per cent of the pneumococcus sputa, 53.7 per cent of the pleural exudates, and 70.4 per cent of the purulent pleural fluids.

4. Thirty-four per cent of straight pneumococcus pneumonias were complicated by chest fluid and 25 per cent by empyema; 26.3 per cent of pneumococcus and hemolytic streptococcus pneumonias were complicated by chest fluid and 24.9 per cent by empyema; 15 per cent of pneumococcus and nonhemolytic streptococcus pneumonias were associated with pleural fluid and 7.5 per cent with empyema; 26 per cent of all pneumonias in which pneumococci played a part had chest fluid and 20 per cent had empyema. Hemolytic streptococcus pneumonia was complicated in 37.3 per cent of the cases by chest fluid and in 25.4 per cent

by empyema. In spite of the fact that in the 116 cases of pneumonia in which were found type pneumococci, 22 of the 26 empyemas were caused by hemolytic streptococci. Three empyemas caused by pneumococci were found in patients in whose sputum they had found no pneumococci. It is Scherer's general belief that the hemolytic streptococci are seldom the primary cause of pneumonia, but that usually they assume an important and principal part in the final result of the cases of pneumonia.

5. Some of the hemolytic streptococci, or at least a portion of the organisms, are bile soluble, this factor being precipitinogenic. According to ability to ferment different sugars, the hemolytic streptococci causing empyema may be divided in four groups. If these groups be accepted we have further argument for the belief that the streptococci are not the primary cause of the pneumonia, but are secondary invaders. These streptococci have a large common group factor in producing precipitin, but also contain specific precipitinogenic groups.

6. In the treatment of hemolytic streptococcus empyema drainage is necessary, the time for this being determined by the condition of the patient. Active immunization by the injection of autogenous vaccine seems to be of value in some cases.

7. In many hospitals routine leucocyte counting on the first and tenth days of pneumonia and on the first, second, third, and tenth days after operation for empyema has proven to be of value. This does not preclude leucocyte counting at other times if indicated.

TONSILLECTOMY IN MYOSITIS AND ARTHRITIS.

LILLIE and LYONS, in the *Journal of the American Medical Association* of April 26, 1919, summarize their views as follows:

1. It is justifiable to advise a tonsillectomy in every frank case of myositis or arthritis.

2. A marked improvement may be assured from tonsillectomy alone in 79 per cent of all cases.

3. It is necessary to remove all possibility of dental sepsis; by so doing a larger percentage of patients will be improved.

4. The duration of the myositis or arthritis is a factor in the ultimate results, although benefit and even complete cure is obtained in some long-standing, chronic cases.

5. Forty per cent of the patients with chronic myositis or arthritis who are invalids will respond favorably to tonsillectomy.

6. The size of a tonsil has no bearing on its possibility as a focus of infection. A careful expression of the tonsillar crypts and a history of throat trouble associated or not associated with the myositis or arthritis is essential in the diagnosis.

7. An absence of a history of diseased tonsil in no way eliminates the organ as a focus of infection.

8. A clean tonsillectomy, with the removal of the plica tonsillaris, is necessary in every case.

THE TREATMENT OF ASTHMA.

STEWART, in *The Practitioner* for April, 1919, states that during an attack the hypodermic administration of morphia or adrenalin is usually resorted to. He does not say that these should never be used, but their use should be restricted to those patients who are desperately ill. If used frequently they only pamper and confirm the disease. The repeated use of one produces a habitué, and the other sooner or later enfeebles the heart muscle and thus leads to dilatation.

At the beginning of a paroxysm a brisk emetic acts like a charm. Fifteen to twenty grains of freshly powdered ipecacuanha, or three grains of tartar emetic, produce an after-effect which is grateful to the patient. Apomorphia hypodermically also acts well, and has the combined advantage of being an emetic and sedative. As the attack abates, potassium or sodium iodide in ten-grain doses should be administered; the action of these is greatly hastened when combined with an alkaline salt, preferably

potassium bicarbonate or citrate in twenty-grain doses. If there is still much distressing cough, he combines the iodide with antipyrin in five-grain doses, four-hourly, for it is a powerful sedative and antispasmodic. Any of the usual cough sedatives containing morphia or opium are contraindicated. As the attack subsides the patient feels well through the day, but toward the early morning he has dyspnea varying in severity. When this occurs, five to ten grains of acetylsalicylic acid give relief, if administered in powder at bedtime. When the attack has apparently disappeared he puts the patient on five grains of potassium iodide combined with five minims of liquor arsenicalis, thrice daily after meals, and gives this for two months. If iodism is produced, calcium iodide in four-grain doses may be tried, but often fails. Then an excellent substitute is found in the glycerin of hydriodic acid.

Following the iodide course he gives liquor arsenicalis combined with liquor strychninæ, in seven-and-a-half-minim doses for one month.

The most important part in the treatment of asthma, however, is the dieting of the patient, and is really the keystone to success. This must consist of food in which proteids bulk largely, with the exclusion of sugar and all farinaceous stuffs, the patient partaking only of food in which carbohydrates are reduced to an absolute minimum, avoiding thus the condition described by Francis Hare as hyperpyremia.

Given a man of generous weight with an attack of true asthma, when put on the above, making sure that the diet plays the most prominent part in the treatment, and a probable cure can be assured. Stewart believes there is nothing surer in the whole domain of therapeutics.

The difficulty lies in treating the thin asthmatic, but this is often overcome by careful watching and management. When he is put on the course of iodide, Stewart gives him a non-carbohydrate diet as before. With this he gives him two to three pints of milk per diem, and pure cod-liver oil in slowly increasing doses. He avoids oil emulsions, for they contain starch. Thus treated one will find the patient will gradually put on weight, and with this increase the asthma disappears. If by any chance the thin man puts on weight continuously till he becomes decidedly overweight, his asthma returns. When the fat man loses his asthma by dieting, and still continues to lose condition until he becomes positively underweight and markedly thin, the asthma returns. To insure success Stewart asserts that the weight must be studied.

THE RESPONSE TO CALCIUM SHOWN IN MANIACAL STATES.

GRAVES, in the *British Medical Journal* of April 5, 1919, states that in acting on deductions drawn from physiological observations he resolved to test the effect of the exhibition of calcium in persons suffering from various degrees of excitement. For this purpose he chose the lactate as the most suitable salt in order to have the action of the calcium ion unimpaired by other elements. Moreover, as the lactate is easily soluble in hot water and remains in solution when cold, a convenient means of administering the drug is available.

He does not discuss the mode of action of the element in these cases; this and other cognate matters will be dealt with fully in another communication. He only wishes to report the effects observed not only in the mental state but also in the circulatory system.

The action of the drug became evident at least during the twenty-four hours following its exhibition. The acute mental symptoms were alleviated without the production of the stupor so commonly observed resultant from the action of the "sedative" drugs—if, indeed, they produce any effect at all in many cases. Instead of the rapid, at times almost uncountable, pulse with its flaccid artery and variable but always low systolic pressure, the pulse becomes slower, the artery normally constricted, and the pulse wave stronger, indicative of an improved action of the ventricular myocardium.

The action of the drug has been equally satisfactory in the distressing restlessness

and excitement of agitated melancholia and confusional states as with the simple mania. Those cases in which influenza has been assigned as the principal cause have reacted well to the drug. These cases had resisted ordinary sedative treatment, but with this definite addition of calcium to the diet—for that is what the treatment amounts to—a vicious circle seems to have been completely broken, and they are making good progress toward recovery.

Many of the other cases in which, owing to the duration of the character of the mental disorder, complete recovery can hardly be expected, have nevertheless shown amelioration of the more acute symptoms, which may well be a determining factor in leading to an improvement of variable degree.

So far Graves has contented himself with giving ten grains three times a day with food, and when a response has been obtained dropping the dosage to five grains. In one particularly distressing case of agitated melancholia, in addition to the doses by day, one or two doses have been given at night. It was interesting to note that in one case of mania with diarrhea not only was the restlessness and excitement allayed, but the number of stools passed fell from six to one.

So far no untoward effects of any kind have been observed, and, considering the small doses employed, these can hardly be expected if careful observations on the pulse are made.

THE EARLY TREATMENT OF FACIAL PARALYSIS.

MARTIN, in the *Medical Record* of April 19, 1919, states that recently he read an interesting paper upon the etiological factors bearing upon the therapy of Bell's palsy. In the course of the paper there appeared the following paragraph:

"During the first ten days to two weeks no electricity should be given whatsoever. But about the end of this time a test should be made electrically to determine the amount of damage done. If faradic irritability is present in any degree, a more favorable prognosis is in store for the patient. He has seen these patients get better within two weeks."

The author then goes on to those cases of longer standing in which may be found the reaction of degeneration with their less favorable prognosis, and he then further outlines their treatment electrically, using the well-known interrupted galvanic current.

Martin thinks there are some points in this paper that will bear investigation as to their merit. Why should we delay even ten days before treating electrically? These statements are not followed by any explanation so that one can properly judge their correctness, so they are open to question.

As neuritis may be recognized as the factor involved in a fair number of cases, there can be nothing gained by waiting for the neuritic process to extend. The logical thing to do would be to get at it at once when recognized, and the only method of treatment of avail is the electrical. This does not mean the use of the interrupted galvanic current, but the more modern method. As in any case of neuritis, we have the inflammatory exudate causing mechanical pressure at the points of exit of the nerve, and naturally this must be removed before a cure can be had. The best current for this effect is the static wave current, which by its mechanical action causes frequent contractions of the tissues, thus breaking up adhesions and clearing out the exudate.

It can be readily seen that the longer the exudate remains *in situ* the more likely is it to become organized, and thus make additional pressure, with the resultant effect of interrupted motor and sensory function.

Hyperemia appears to be one of nature's methods of restoration, and in her effort to secure this we often have a circulatory stasis instead. If, therefore, we can produce a true hyperemia, it would seem logical to believe that we could restore function, granting that the pressure had been removed from around the nerve. This calls for radiant light and heat, produced by radiations from a high-candle-power carbon-filament lamp properly hooded, so that the

rays are thrown in parallel. This, applied over the face to a point of active hyperemia, will meet the requirements. The two treatments mentioned, static wave current and radiant light and heat, should be used as early in the case as possible after the paralysis happens, for the rapidity of relief and cure depends upon this early treatment.

In those cases which the physician unfortunately does not see as early, there must be used in addition the slow, surging sinusoidal current, the basis of which may be the constant or galvanic current if preferred. The interrupted galvanic is a harsh method of applying the current, and once a patient has the sinusoidal used it will be impossible to have his consent for the use of the interrupted current, for the difference is so marked, when comfort is considered, that they cannot be placed in the same class.

As an etiological factor we must not lose sight of focal infections. As these cause a neuritis of other nerves, so may they be the cause of facial paralysis, and all tooth abscesses, pyorrheal pockets, and other foci must be eliminated before we can expect to secure the effect that we desire.

In his experience there have been cases of atrophy of the facial muscles in cases of facial paralysis of only two months' standing. This shows the danger of delay. In every case of this kind it has occurred as the result of the physician's advice to wait before doing anything. Such advice usually calls for six weeks' delay before using electricity, and is the result of medical teaching of decades ago, from which many do not seem to have recovered, in spite of what has been since taught by modern electrotherapists.

Within recent time three cases came to Martin's notice that illustrate what this paper is meant to imply, the danger of delay. These cases came within two days, one being a case a week old, another six weeks old, and the third of over two months' duration. The latter had well-advanced atrophy and all the physical signs exaggerated. It will not be necessary to go into detail concerning the treatment of these, except to say that it was instituted at once in all cases. The first promptly got well under electrical treatment, being of less than two weeks' duration; the second improved considerably in three weeks, but did not continue treatments until entirely cured; while the third was forced to continue them for nearly two months.

In the latter case the atrophy entirely disappeared, but there remained for a considerable time the inability to pucker the mouth sufficiently to whistle. This finally came also, and the patient was discharged cured, but somewhat sore about the physician's advice of delay in treatment.

In his judgment this cannot be too much emphasized, that in delay we have danger, that all cases must receive prompt treatment, and that if modern electrical methods are used we will have prompt results from prompt treatment.

TREATMENT OF TAPEWORM BY THYMOL.

McIntire, in the *Indianapolis Medical Journal* for April, 1919, states that his experience with thymol as an anthelmintic has been confined solely to its use against the tapeworm. This experience covers six cases over a period of seven years. The cases have been followed and there has not been a single recurrence.

The first difficulty was in deciding upon the dosage, because there was no rule of dosage to follow. Small doses failed to produce results, and the reports of fatalities argued against the use of large amounts at single doses.

The following procedure was adopted: Absolute fasting for thirty-six hours, with saline laxative at the beginning and end of first twenty-four hours. At the expiration of thirty-six hours, ten grains of thymol in capsules were given every hour until vertigo was produced. When this appeared another saline was given and the patient placed over a jar containing hot water. The amount of thymol required has varied in McIntire's experience from thirty to sixty grains. The length of parasite varied from fifteen to sixty-six feet.

The patients complained of nothing except vertigo and a sensation of heat. They

were all able to follow their usual duties the next day. They were equally divided as to sex, varying in age from twenty to forty-eight years.

One of the females was pregnant. The treatment had no effect on the pregnancy.

One male was tuberculous. The pulse and temperature were in no way affected.

The remaining cases offered nothing of interest. Thymol does not produce vomiting nor disturb the digestion as do male-fern and pomegranate, and it is much more certain in its actions than pumpkin seed.

When given in ten-grain doses repeated hourly the danger of poisoning is small. The one caution is never to follow thymol by oil, as oil puts it in solution and allows too rapid absorption.

FAT METABOLISM OF INFANTS AND YOUNG CHILDREN.

HOLT, COURTNEY and FALES, in the *American Journal of Diseases of Children* for June, 1919, state that the fat retention of infants taking cow's milk averages 88.6 per cent of the intake; of those taking breast milk it averages 95.8 per cent of the intake. The daily loss of fat by infants fed on cow's milk is over twice as great as that lost by those taking breast milk, even though the actual amount of intake is somewhat less.

The material presented in this article comprises the results of analysis of 128 stools of seventy-seven infants whose ages ranged from two to eighteen months, fed on modifications of cow's milk.

The average fat per cent of the dried weight in normal stools was 36.2. The hard, constipated stools showed no variation from this figure. In the stools not quite normal in appearance the average fat per cent was slightly lower. In severe diarrhea the fat per cent of dried weight was much higher, reaching an average of 40.7.

The soap per cent of total fat was very high in both normal and constipated stools, averaging, respectively, 72.8 and 73.8 per cent. As the stools became less normal in appearance the soap fat diminished rapidly and averaged in the loose stools only 30.6 per cent of the total fat, in the diarrheal stools 12.4 per cent, and in those of severe diarrhea only 8.8 per cent of the total fat.

The neutral fat was less than 10 per cent of the total fat in normal and constipated stools. It increased as the soap fat diminished, and in diarrheal conditions made up about 60 per cent of the total fat in the stool.

The free fatty acids constituted about 17 per cent of the total fat of normal and of constipated stools. It was increased somewhat as the stools became less like the normal, and in the diarrheal stools was over 30 per cent of the total fat of the stool.

No definite relationship was shown between the daily fat intake and the per cent of fat or the distribution of fat in the stool.

The average of the fat retained with normal stools was 91.3 per cent of the intake. The retention was but little lower when the stools were somewhat harder or softer than normal, or were not homogeneous, or contained more or less mucus without being distinctly watery. As the water in the stools increased, the per cent of retention dropped markedly, reaching in severe diarrhea 58.4 per cent of the intake.

There was no striking relation between the fat intake and the per cent of the intake retained, except when the intake was abnormally low.

INFLUENCE OF FASTING AND VARIOUS DIETS ON THE LIVER INJURY EFFECTED BY CHLOROFORM ANESTHESIA.

DAVIS and WHIPPLE, in the *Archives of Internal Medicine* of May 15, 1919, in summarizing their article state that:

Starved animals are very susceptible to liver injury from chloroform. A maximal injury is to be expected.

Sugar, and diets rich in carbohydrates, fed in the days preceding chloroform anesthesia, exert a marked protective action against liver injury.

Fat alone, or combinations of food con-

taining fat in large proportion, induce a maximal susceptibility to liver injury comparable to starvation.

Skeletal muscle and heart muscle seem to have a slight protective action.

Beef extract is highly protective in proportion to its actual food value.

The parenchymatous organs, liver, and kidney exert a considerable amount of protection.

Brain, although rich in lipoidal substances, is a protective food against chloroform injury, thus being in marked contrast to fat mixtures.

Skim milk alone, and commercial casein alone, or in combination with cracker meal, are highly protective diets.

Gelatin has but slight protective action itself, but when given in mixtures with sugar does not lessen the protective value of the latter.

Thyroid powder, given alone, or in combination with foods (sugar, fat, etc.), apparently does not modify the chloroform injury which is to be expected without such addition.

Glucose, or cream, given intravenously during chloroform anesthesia, does not modify the effect of the drug on a starved animal. One instance in which casein digest (high in amino-acid content) was given by stomach tube a few minutes before chloroform anesthesia indicates a slight protective action.

No single theory so far advanced will explain this peculiar protective action of certain food substances against the liver injury of chloroform anesthesia. It certainly is a reaction of the liver cells, and not of substances circulating in the blood stream.

These facts should not be lost sight of in the management of any human cases in which chloroform is indicated. The patient should be given liberal amounts of carbohydrates and milk for at least two days preceding the anesthesia. It cannot be too often emphasized that it is dangerous to give chloroform to man or animal whenever a fasting period has preceded the administration of the anesthetic.

HUMAN SERUM IN THE TREATMENT OF INFLUENZA BRONCHO-PNEUMONIA.

GOULD, in the *New York Medical Journal* of April 19, 1919, states in his report that the diagnosis of the influenza type of pneumonia in his series of cases at the Brooklyn Naval Hospital was made upon the clinical picture of the case, together with the sputum findings and the leucocyte count. A case of bronchopneumonia showing the symptoms of headache, prostration, and early cyanosis with a mucopurulent or bloody sputum which would not type and giving a low leucocyte count was considered a probable case of influenza pneumonia. In many but not all of these cases the influenza bacillus was demonstrated. He concluded that he could materially, if not completely, modify the course of the disease in most of these cases by the use of the human serum.

During the recent severe epidemic he has experienced the same difficulties that have been met with elsewhere. Many of his cases have presented clinical pictures simulating influenza pneumonia very closely; showing the characteristic early depression and cyanosis and a leucopenia, but giving no response to repeated injections of human serum Many of these cases have later been shown to be cases of infection with the streptococcus hemolyticus, and on account of the severe general toxemia, the frequent development of pleurisy and empyema, and the unusually severe pulmonary hemorrhages which have often occurred, he believes that the streptococcus hemolyticus played a more important rôle than he was always able to demonstrate. He did not feel justified in puncturing the lung for purposes of diagnosis only. Inasmuch as this differential diagnosis could not always be made in the early stages of the disease and he felt that the treatment should be begun at the earliest possible moment, the mortality rate in his cases recently treated with human serum has been very unsatisfactory. He has included in his list all those who have received even a single dose of human serum, and his mortality rate among all those so treated during the last two months has been twenty-six per cent.

During the last epidemic he at first endeavored to select the cases and use human serum in those cases only that were very probably influenza, using Type I, and sometimes polyvalent serum in those that could be typed. He soon found, however, that the bacteriological results were not very reliable and that even those cases that had a leucocytosis and a sputum that would type showed upon post-mortem examinations a lobular consolidation with that peculiar serous bloody exudate so frequently spoken of as a hemorrhagic pneumonitis. It seemed likely that the influenza bacillus, as well as the streptococcus organism, was a frequent offending agent with the pneumococcus. During this whole season he has not had more than two or three cases examined post mortem that showed the characteristic red or gray hepatization of the ordinary pneumococcus infection. He has, therefore, been using recently as donors many of these cases of pneumonia which had previously had a leucocytosis, and even some of those whose sputum had been typed; and has noted that excellent results were apparently obtained with the blood of some donors who had shown a moderate leucocytosis during their previous attack. It is quite possible that he may thus be using a serum from a case of mixed infection including the influenza bacillus and streptococcus hemolyticus, and that the serum contains valuable immune bodies for homologous strains. It has been shown by Hamilton and Havens at Camp Wadsworth that the serum from rabbits immunized against certain strains of streptococcus hemolyticus will protect mice infected with a homologous strain, but will not protect those infected with a strain serologically different.

In using the human serum he has not employed the pooling method, but has endeavored to match the donors and recipients as far as possible. He has no reliable way of measuring the potency of any particular serum, but has repeatedly been struck with the remarkable results obtained from the use of certain donors. Others, however, show no apparent results; but by using individual sera he is able to try a second donor if the first failed.

Gould has not been able to confirm the contention of Redden that the amount of lung involvement in the donor is necessarily a reliable criterion in determining the value of his serum, although in general he believes that it is of some importance. As a result of Gould's work he has been impressed with the belief that the human serum from convalescent pneumonias undoubtedly contains valuable antibodies, and that its use in cases infected with homologous strains will give satisfactory results; but with our present limited ability to definitely isolate the infecting organism of the donor and the recipient, the method cannot yet be placed upon a practical basis where definite results can be reasonably expected.

Furthermore, this method cannot be used except in large, well-equipped hospitals where access can be had to many willing donors. One of Gould's greatest difficulties was to get sufficient donors at the time that the recent epidemic was at its height. Many apparently desirable donors were eliminated on account of previous diseases which made them ineligible. In the Naval Hospital he has seldom had difficulty in persuading them to become willing donors; but in private practice or in civilian hospitals this factor would become an important one.

He has had no bad results from the withdrawal of 400 to 500 Cc. of blood from the donors at each of two sittings at intervals of two to three days. He does not use them as donors until the temperature has been normal for several days and the patient is convalescent, but he does not wait for the lung to become fully resolved. Only occasionally donors may feel a little faint, but the most prominent after-symptom is an excellent appetite. In no case has he seen any untoward effect from the injection of the serum. Since he uses the human serum only there is no danger of an anaphylactic reaction, nor is there any need of a test for hemolytic compatibility. [Why this is true we do not understand.—Ed.]

During the recent increased incidence of pneumonia Gould has been impressed with the fact that we are dealing with cases which vary greatly in their clinical aspects

and are found to be due apparently to various organisms. The epidemic character of the disease is much less prominent than last fall; cases of secondary infection are seldom seen and no nurses or corps men have acquired the disease for months. It would seem that the exciting cause has changed somewhat in character since last fall, so that only a small number of the cases now appearing can be reasonably attributed to the same inciting factor which existed at that time. The selection of donors, as well as the interpretation of results, would become a much more difficult task if we attempt to treat by the use of human serum only those cases which are believed to be so-called influenza bronchopneumonia.

THE GASTRIC RESPONSE TO FOODS.

BERGEIM, EVVARD, REHFUSS and HAWK, in the *American Journal of Physiology* for May, 1919, state with reference to rapid drinking versus slow drinking of milk, that milk drunk rapidly left the stomach sooner and produced a smaller curd mass than milk drunk slowly or sipped. They found an individual who could voluntarily regurgitate his stomach contents.

Raw versus boiled milk. Raw whole milk in the human stomach formed firm white curds which had "rubber-like" characteristics. The maximum curd formation took place at about one hour after the milk had entered the stomach. These large curds were apparently formed through the coalescing of numerous smaller curds. At this period curds as large as a man's thumb and weighing at least 15 grammes may be formed.

Milk which had been boiled five minutes curdled in an entirely different manner. In this case the curds were small, soft, flaky, and of a yellow color. The largest curds were about the size of a small pea. These curds left the stomach sooner and were more digestible than the tough curds resulting from the ingestion of the raw milk. Dietetically, therefore, boiled milk is to be preferred to the raw product. The boiling of milk for five minutes, in their tests, did not materially alter its nutritive value or growth-promoting properties, but may have lowered the antiscorbutic value.

Skimmed versus whole milk. Particularly tough, hard curds of large size were formed in the human stomach after the entrance of raw skimmed milk. These curds formed very quickly (one-half minute), and inside of five minutes they coalesced to form curds as large as a man's thumb. The skimmed milk curds, because of their firm, unyielding character, were more difficult to regurgitate than were the whole milk curds. The regurgitator also complained of a "heavy" feeling in his stomach soon after drinking the skimmed milk.

When the skimmed milk was boiled, the resulting curds were not as large and tough as were those of the raw skimmed milk, nor as small and soft as were the curds of boiled whole milk. The largest curd after one hour was about the size of a small kidney bean. Inasmuch as the boiled skimmed milk contained only about 0.5 per cent fat (sp. gr. 1034), whereas the boiled whole milk contained about 4 per cent fat, it is apparent that the fat content is an important factor in determining the character of the curd in boiled milk. The curds of the boiled whole milk were digested more rapidly than were those of the boiled skimmed milk.

Influence of sodium bicarbonate on curd formation. The addition of two and one-half grammes of sodium bicarbonate to 500 Cc. of raw whole milk caused the formation of curds which were smaller and softer than those produced in similar milk in the absence of bicarbonate. There was a definite curd formation at five minutes, although the stomach contents remained alkaline for thirty minutes. That the bicarbonate treatment was not as effective as was boiling in producing small soft curds was shown by the fact that the curds of the boiled whole milk were smaller and softer than were the curds in the milk after bicarbonate had been added. The boiled milk also left the stomach sooner than the bicarbonate milk.

Influence of milk fat on curd formation.

As a general rule the character of the milk curds was influenced in a very direct way by the fat concentration—*i.e.*, the more fat the less curd. Not only was there less total curd formation, but the curds which were formed were smaller and softer the higher the fat concentration. In fact, when 40-per-cent cream was drunk no curds were formed during the first half-hour, and even when the largest curds were only about the size of the head of a pin they did not coalesce to form larger curds, as was the case in milk of low fat content.

The milks of high fat concentration were also very slow to leave the stomach. In fact two and one-half hours after 500 Cc. of 40-per-cent cream were ingested, at least 475 Cc. of material was regurgitated from the stomach. These tests were rather distasteful to the regurgitator, since the rich creams gave him a very uncomfortable, heavy feeling which bordered on nausea. There was a tendency for skimmed milk (0.5 per cent fat) to leave the stomach somewhat more slowly than the raw whole milk (4 per cent fat). They attribute this to the fact that the curds of the skimmed milk were especially tough and were slow to disintegrate under the influence of the gastric juice.

Influence of pasteurization on curd formation. Pasteurizing of milk is not nearly as effective as boiling in altering the type of curd formation. The curds from pasteurized milk were larger than those from boiled milk, but not so large as those from the raw whole milk. In short, the curds of the pasteurized milk were intermediate in character between the curds of raw and boiled milk, but had a tendency to resemble more closely the curds of raw milk. There was, however, less tendency for the pasteurized curds to coalesce with the formation of a large curd aggregate.

Influence of dilution on curd formation. The drinking of water before the milk was ingested had no material influence upon the curdling tendencies of the milk, with the exception that the curds were somewhat softer and the maximum-sized curds were smaller than when no water was ingested. It seems probable that the extra volume of fluid in the stomach prevented the smaller curds from coalescing with the formation of large masses.

Influence of temperature on curd formation. Milk curdled very quickly in the stomach irrespective of the temperature. There was a slight slowing of the coagulation rate in the case of milks which were considerably below body temperature, but the delay was not pronounced. The milks at 20° C. began to curdle between one and two and one-half minutes, whereas milks at 37° C. showed signs of curdling at the one-half-minute interval.

The curdling of mixtures of boiled and raw milk. When a mixture composed of 80 per cent boiled whole milk and 20 per cent raw whole milk was drunk the resultant curds were very similar in character to those obtained from the ingestion of straight raw whole milk. Large curds were regurgitated at the twenty-minute period, and the soft, yellow, fluffy curds typical of boiled milk were not in evidence.

DENTAL INFECTIONS IN CHILDREN.

SMITH, in the *Archives of Pediatrics* for March, 1919, states that the lessons which have been learned from his work are:

1. On account of the time-consuming difficulty in handling children, the teeth of these little patients are too often neglected by the parent, dentist, and physician.

2. Too much attention is paid by the physician to the tonsil alone and little to the often primary foci around the teeth.

3. While his series is small it opens the way for a great deal of experimental work which will undoubtedly be of clinical value.

4. Children's teeth, infected as they are, must be extracted, if the focus cannot otherwise be sterilized, and this rarely can be accomplished. Though many dentists are of the opinion that premature extraction of deciduous teeth may result in the retardation of the development of the dental arch and be the indirect cause of malocclusion of the permanent teeth, he is of the firm opinion that these infected areas, as

well as those in other parts of the body, must be eradicated.

5. While this may be one of the causes of malocclusion, it is a lesser evil than the constant absorption of infected material from the peridental area, which may be the etiological factor in embolic disease of other organs of the body, as shown experimentally in this series by the high percentage of this type of infection.

6. Teeth must not be considered as an organ apart from the rest of the body, for only by considering the whole human system can permanent results be obtained. When this is thoroughly appreciated, then, and then only, can dental infections, their causes and results, be successfully treated in children.

7. The pediatrist, the laboratory technician, the roentgenologist, the dentist, and others specializing in different body areas must not work alone with the hope of eradicating disease, but only by the closest coöperation can successful results be obtained.

BLOOD SUGAR IN DIABETES.

WILLIAMS and HUMPHREYS, in the *Archives of Internal Medicine* of May 15, 1919, conclude:

1. It is important to distinguish between blood sugar level and the renal threshold for sugar. The height of the blood sugar level at which appreciable quantities of sugar are eliminated in the urine is considered the renal threshold. The blood sugar level in various stages of diabetes may be much higher or lower than this point.

2. There is no striking relation between the height of the renal threshold and the duration of the diabetes. It would appear, however, from the analysis of their sixty-five cases that the threshold tends to rise with the increasing duration of the disease.

3. Younger diabetics as a rule have low or normal thresholds. The threshold rises with advancing years.

4. When the diabetes is mild or quiescent, the point at which the kidneys eliminate sugar is stationary; but when the disease becomes progressive, the threshold tends to rise. Indeed, before death the blood sugar renal threshold may reach great heights with little or no sugar appearing in the urine.

5. A rising renal threshold for sugar in the face of careful dietary treatment is a serious prognostic sign.

6. A high renal threshold for sugar in mild diabetes under proper dietary regulations usually indicates some complication, as arterial hypertension.

7. A high renal threshold for sugar may mean a physiologic expedient to conserve food material.

8. Their experience leads them to the belief that persistent high blood sugar levels promote exhaustion and rapid decline of function, and the high threshold is merely a safety measure.

9. In severe diabetes, where extremely low diets are necessary to maintain life, the high threshold is essential to take care of the seriously impaired carbohydrate metabolism.

10. In the treatment of diabetes it is desirable to maintain the blood sugar level as nearly normal as possible, even though severe restrictions in diet may be necessary for this purpose, notwithstanding the fact that the high threshold will permit of a much more liberal diet without the appearance of sugar in the urine.

11. They regard with misgiving and apprehension any plan of treatment of diabetes which permits of food just short of the point of glycosuria. In short, they believe that diabetes should be controlled on the basis of the blood sugar level rather than by urine tests.

12. A persistent low blood sugar level may be regarded as an extremely favorable prognostic sign.

13. A persistent high blood sugar level, in spite of undernutrition, usually points to an unfavorable outcome.

14. In their experience, cases which hitherto had been intractable and had shown progressive loss of food tolerance, when the blood sugar level was disregarded, have been greatly benefited and their tolerance increased by regulating the food intake so

as to insure, when possible, a normal blood sugar level.

15. While they regard 0.15 per cent as the maximum normal digestion blood sugar level, they believe patients are safer when this level is not higher than 0.13 per cent.

THE INFLUENCE OF DRUGS AND CHEMICAL AGENTS ON THE LIVER NECROSIS OF CHLOROFORM ANESTHESIA.

DAVIS and WHIPPLE, in the *Archives of Internal Medicine* for May, 1919, state that:

Sodium carbonate in hypertonic salt solution given intravenously during chloroform anesthesia has no protective action against the resultant liver injury.

Phosphate solutions, high in buffer content, have no protective action against chloroform liver injury.

Adrenalin subcutaneously or intramuscularly in the days preceding chloroform anesthesia exerts a distinct protective action against chloroform liver injury. The resistance requires time to develop, and is not demonstrable by a single dose of Adrenalin a short time before chloroform administration.

Quinine sulphate given in the days preceding chloroform exerts a marked protective action against liver injury.

Hydrazin sulphate, although itself injurious to the liver, apparently does not intensify (perhaps lessens) the toxic action of chloroform.

It would appear that strychnine sulphate has very little deleterious action on an ordinary chloroform injury following starvation.

Toxic proteose solutions in large dosage may intensify the chloroform injury, but in small amount seem to have no effect.

Potassium cyanide given intravenously during chloroform anesthesia, although very toxic at the time, seems to exert little, if any, influence on the delayed chloroform poisoning (liver injury).

The hypothesis that glycogen protects the liver cell against the injury of chloroform will not explain all the observed facts. Some of the experiments are in harmony with this hypothesis, but others are equally positive against it. This simple explanation of the resistance of liver cells to chloroform injury does not suffice, and undoubtedly other factors are concerned which must be searched out.

The hypothesis that chloroform injury and liver necrosis is to be explained by a lowering of the level of tissue oxidation (tissue asphyxia) receives no support from their experiments.

The peculiar protective action of adrenalin and quinine sulphate in chloroform poisoning may have some practical clinical application.

PROPHYLACTIC USE OF QUININE IN MALARIA.

RAWNSLEY, in the *British Medical Journal* of April 19, 1919, states that Colonel Sir Ronald Ross, K.C.B., K.C.M.G., has requested him to state his opinion for publication with regard to the value of "prophylactic quinine" as a preventive of malaria in those with no history of infection. It was his desire that the statement should be made at the recent meeting of the British Medical Association in London during the discussion on malaria, but this was not possible owing to the lack of time.

During the period that he served with the 12th Corps, British Salonica Force, quinine for this purpose was given in the following dosage:

1916: 5 grains and 10 grains on two successive days in the week, the former amount being more generally employed.

1917: (*a*) 10 grains on two successive days weekly; (*b*) 10 grains on two successive days twice weekly, on Wednesday and Thursday, and Saturday and Sunday; (*c*) 10 grains daily; (*d*) 15 grains daily; (*e*) 20 grains daily.

The three last amounts were given temporarily to troops a few days before going into, during the period of occupation of, and for a few days after coming out of, highly malarial parts of the front trenches.

This dosage completely failed to prevent

the incidence of malaria. In one battalion to which the large doses of daily quinine were given there was little apparent sickness, the daily dose kept down pyrexia, and the men were thus enabled to carry on with their duties; but after some weeks it was found that these men were affected by chronic malaria as shown by the presence of the parasite in the blood, enlargement of the spleen, anemia, etc., necessitating their admission to hospital in large numbers. It was estimated that at least 80 to 90 per cent of units were infected.

In 1918 it was decided to give no prophylactic quinine, as the general opinion amongst the majority of medical officers was that no dose that could be tolerated had any protective value to troops exposed under campaigning conditions. Reliance was placed on other methods of malarial prophylaxis and cases treated as they occurred.

With this opinion Rawnsley is in entire agreement.

SPECIAL TREATMENT THAT SHOULD BE-GIVEN MILK INTENDED FOR INFANT FEEDING.

KITCHEN, in the *Medical Record* of May 3, 1919, states that in regard to modification he does not accept the views of those who think that cow's milk is all right if it is only diluted with water. In view of our lack of full information as to the use for the albuminous principles in the body, we should not be too positive as to the best nutritive requirements of the infant in regard to the protein elements in its food. Nitrogenous matter is the spring of vital action. Without it no life is manifested. We know that it is needed in muscular and other structural developments and their functioning. It is required for secretory purposes, and especially in milk formation. The carnivora and the wild races of man may have to adjust themselves to meat as food because of its availability; but albuminous matters are not absolutely essential to the production of force or to form fat; and the production of urea is only a sequence to prevailing conditions. It is possible that a generous presence of nitrogenous matters in the body may be essential in securing a general stimulative nutritive and functioning effect; but from what we know of the effect on adults of ingesting excessive amounts of proteins, it seems desirable that we should exercise considerable caution in including large amounts of proteins in the food of our infant dependents. Excessive amounts may be expected to result in more acidulous gastric products than the alkaline intestinal juices can neutralize; and possibly such excess may set up more or less putrefactive intestinal activity; both of which results are objectionable.

A baby that sleeps most of the time and takes very little muscular exercise certainly does not need a large nitrogenous content in its food, and it can get its force very conveniently from the carbohydrates. But a reasonable nitrogenous supply is of unquestionable importance. There should be a proper proportion of albumin, but not an excess of casein. That special nitrogenous constituent should be modified as to its natural coagulability. At each time of feeding, water, albumen, earthy salts, sugar, and a flocculating constituent can be easily, conveniently, and safely added to a standardized, cream-enriched milk that is sufficiently water-free to furnish an adequate concentration of nutriments for a twelve-months'-old child. The precaution needed is that the basic milk is pure and safe. All the modifying agents, other than the cream, can be thoroughly heated without damage to them. But the basic milk cannot be sterilized without injury to it. Dextrinized oatmeal gruel seems to be unequaled as a modifier when a laxative effect is desired. Probably some of its specific effect is due to the mechanical action of the large cellulose content that resists dissolution from heat in the making of the modifying gruel. Dextrinized barley has been such a standby for so long a time that it seems almost unfriendly to think that there may be something to take its place that is better; but as the result of some of his research work, Kitchen is inclined to think that concentrated whey, if properly prepared, may be better than barley, because

the latter, along with oats, has a large content of collulose detritus.

So far as he is able to judge, concentrated whey flocculates milk as well as or better than barley. Rennet-treated whey and milk resist the hardening effects of unmodified milk coagulation when heated. It is possible that all babies' milk should have more or less concentrated whey added to it prior to its feeding. Whether the albumin, earthy salts, and milk sugar in milk whey are better than those from cereals, he has no knowledge. Further study in this connection is desirable.

Kitchen is against the general use of any of the standardized prepared baby foods if fresh, uninfected, and purified milk with a sufficient amount of butter-fat in it can be secured. The growth principle that is in butter-fat must always be remembered in the future. However, there are situations in which it is not possible to procure good fresh milk. It is theoretically possible to meet that need partly in a modified dried milk powder, which in conjunction with an intelligent auxiliary modification may be serviceable. But so far he has not examined any entirely satisfactory dried preparation. Deficiency in butter-fat content, overheating, insolubility, objectionable taste, large bacterial content and quick decomposition after dissolving seem to be usual defects. Most of them have much unconverted starch; but sufficient boiling changes hydrated starch into dextrin. He is undecided as to whether vegetable albumin and casein may successfully replace animal constituents of like nature; but it is certain that the vegetable oils will not supply the growth principle that is in butter-fat, and they are not as digestible; this defect in vegetable oils may be due to irritating matters in them, as those which markedly exist in croton, castor, cotton, and other oils. Manufacturers of dry milk powders, so far, have not been able to overcome the decomposition action in butter-fat in their preparations when exposed to air, and when held at fermentable temperatures, if largely present.

TREATMENT OF WOUNDS BY PARAFFIN.

PRATT states that he knows (*British Medical Journal,* March 1, 1919) of no other treatment in which the constitutional symptoms so quickly disappear, in which the pain so rapidly subsides, and in which healing is so uninterrupted, as in wounds and burns treated by soft paraffin.

The wound or burn is first thoroughly cleansed with sterilized water; the paraffin is then melted and either sprayed by a special spray or painted by a sterilized brush over the affected area. One layer of gauze is then placed over the injured part, and then another layer of melted paraffin is either sprayed or painted over the gauze. On the top of this a cotton-wool pad is placed, and then the part is bandaged. The dressing is left undisturbed for twenty-four hours, when it is removed and a fresh application made. A third dressing is applied in ordinary cases the next day, and, when necessary, a fourth dressing two days after.

FOUR CASES OF RENAL CALCULI WITH NEGATIVE X-RAY FINDINGS.

HYMAN (*International Journal of Surgery,* March, 1919) records four cases carefully studied under the supervision of skilled *x*-ray men in whom, so far as the bladder was concerned, there was no evidence of calculi.

These cases bring out several interesting facts. Within a period of a few months four cases were seen in which stones were demonstrated at post-mortem or operation, where negative *x*-ray reports were obtained. The chemistry of three of the stones showed that they were composed chiefly of ammonium urates. Therefore, one should not be guided or misguided too much by the *x*-rays; negative findings prove nothing. How often, then, can we expect such negative findings? From statistics gathered at Mount Sinai Hospital the author reports the following: In vesical stone, 61 per cent failed to show (series of 57 cases); ureteral stone, 10 per cent (52 cases); renal stones, about 10 per cent. Other authorities give

a larger percentage of negative *x*-ray findings. Latent calculi are not so uncommon. In two or three patients large stones were discovered at post-mortem without symptoms referable to the diseased side. Had the presence of stones in these cases been recognized by the *x*-ray, proper operative procedures might have been of avail.

The passage of a catheter unobstructed through the ureter does not rule out ureteral stone. It frequently happens that even with a large stone the catheter slips by unobstructed. The wax-tipped bougie is of value; it will every now and then demonstrate the presence of a stone when other means fail.

REST IN DERANGEMENT OF THE KNEE-JOINTS.

HENDERSON (*Minnesota Medicine*, April, 1919) observes that the position favorable for the infliction of injury to the internal semilunar cartilage is partial flexion of the knee, and eversion and outward rotation of the foot, so as to turn the head of the tibia outward on the femur. With the knee in this position, the internal semilunar cartilage is placed deeper in the joint than it is in any other position. If the rotating force is applied above instead of below the knee, with the knee partially flexed, but with the foot in the normal position, the femur will rotate inward on the tibia, and the same condition in the knee will be present; that is, the internal cartilage will be nearer the inner part of the joint. If, in this position, the knee is extended, the smooth surface of the inner condyle of the femur may roll down and catch the inner semilunar cartilage. This movement, brought about by the action of the powerful quadriceps while the individual is working or participating in some game, is usually quick and sharp, and cannot be checked in time to prevent damage to the cartilage. The cartilage must either slip away, be torn, or crushed. The external cartilage, if it happens to be caught, as the writer has mentioned, has considerable mobility and may escape. The internal cartilage is closely bound to the capsule and is not permitted this latitude of movement. The type of injury sustained by the meniscus depends on the point at which the crushing force is inflicted on it. If only the anterior end of the cartilage is caught it may be torn loose, and this portion may hang as a more or less pedunculated loose body. The chief symptom produced by such a cartilage is recurrent locking. Owing to the fibrous character of the cartilage, it must be extremely rarely that a complete transverse tear is produced and a free body formed.

If the condyle crushes the cartilage further back, the damage to the cartilage may consist of a longitudinal tear in the middle three-fifths, leaving the anterior and posterior fifths intact. The surgeon in operating on such cases, when opening, as he usually does, over the anterior inner portion of the joint, may be deceived when he sees the anterior end apparently intact. The middle three-fifths of the meniscus in this type of case usually lies in the middle of the joint—that is, the torn portion lies to the outer side of the internal condyle in the intercondylar notch. This has been referred to by Morison as a "bucket-handle" fracture. The outstanding and typical symptom of such pathologic findings is, in not a few instances, a persistent lack of complete extension. In this type the typical attacks of recurrent locking may also occur.

When the patient is seen immediately after the accident, there is pain and disability, and effusion soon appears. The locking may still be present, and an attempt at reduction should be made at once. Place the patient on a hard bed, a table, or on the floor, flex the knee fully with the muscles relaxed, rotate the tibia inward, and then forcibly and rapidly extend the limb, the surgeon pressing on the knee. Usually it can be reduced in this manner, but if the attempt is not successful, it may mean that the middle three-fifths of the cartilage lies caught in the intercondylar notch. Full flexion of the knee preceding the extension may release such a torn bucket-handle cartilage, but if this fails there is nothing to do but to open the joint and remove the car-

tilage. If reduction is successful, the knee should be kept in a cast or splint for at least four weeks to permit the cartilage to grow in place. Although the surgeon may apparently obtain full extension, if the patient insists that "things do not seem right in the joint," it may mean that reduction is not complete. It is wise carefully to consider such a statement by the patient, and not to be too confident that reduction is complete.

More often the patients come to us after many lockings, generally each attack followed by pain and swelling. Some weeks or months may intervene between the accident and the second locking. The patient usually volunteers the information that walking on rough ground or stubbing the toe with the knee partially bent and the foot turned outward is the position in which the locking or catching occurs. The story may not be clearly told, and it is only by careful inquiry that a diagnosis can be made. The patient may be able to release the cartilage by certain motions, the disability may be of only a few minutes' duration, and the soreness following negligible. Many persons go through life with a loose cartilage producing slight symptoms without seeking surgical aid.

The roentgenogram is an aid in the diagnosis only in so far as it is of negative value.

In the case of a loose osteocartilaginous body, there is often, but not necessarily, a history of direct trauma followed by pain. The desiccation of the body occurs later, and it may be only after some weeks that locking is present, whereas in the case of a loose semilunar cartilage the injury is indirect, followed by pain with immediate locking. As a rule the effusion and in fact all the symptoms are less marked in the cases of loose bodies than in the semilunar cases.

A certain group of patients complain of a sort of slipping, not really a catching or locking. No effusion or disability follows, and the pain is not severe. Such cases are not surgical, and it is possible the symptoms are produced by a little fat synovial tag being nipped occasionally between the joint surfaces.

It is always well to question the patient as to whether or not he ever feels anything "come out." By that term he often means a protuberance to be felt on the inner side of the knee over the anterior extremity of the internal semilunar cartilage. This may be present when the knee is "out of joint." If what the patient feels always presents itself in the same place, at the anterior inner part of the knee, it is probably a semilunar cartilage, but if it presents itself at one time above the patella in the suprapatellar pouch, and at another on the inner or outer side, it is probably a loose osteocartilaginous body.

In another group of cases there is a complaint of semicatching or slipping suggestive of a loose cartilage, but usually the patient is middle-aged and there is no definite history of trauma. One must be on guard not to mistake the onset of a hypertrophic arthritis for a mechanical derangement.

The points that should be fulfilled before a diagnosis of deranged internal semilunar cartilage is made are: (1) A history of injury to the knee (not necessarily direct); (2) pain, disability, and locking of the joint, followed by effusion; and (3) a negative radiographic examination. Once the diagnosis of damaged semilunar cartilage is made the treatment must be surgical, either non-operative or operative. If the patient is seen at the time of the accident, the treatment should be immediate reduction as herein outlined, followed by fixation in a cast or splint for four weeks. Only occasionally will it be necessary to open the joint in a recent case. A safe general rule to follow is that a knee having had but one derangement should not be opened.

The technique of operation is as follows:

The anesthetized patient is placed on the table so that the knees come just over the split which allows the foot-piece to drop. The knee is prepared by the benzine and iodine method, care being taken that the scrubbing with benzine is done with the knee extended and flexed. In this manner

the folds in the skin, both anterior and posterior, will be thoroughly cleaned. The leg is painted with iodine from the ankle to well up on the thigh. After the draping with sterile sheets and towels is completed, a tourniquet is applied to the thigh. The foot of the table is then dropped, with the patient in slight Trendelenburg position. The incision is started from opposite the middle of the patella to the inner side, coursing down a little in front of the condylar line that can be plainly felt beneath the finger. The skin incision should be carried well down over the joint line, curving it a little posteriorly, so that the shape resembles somewhat a hockey stick. The knife and tissue forceps used are now discarded, and clean ones are used for the deeper work. Skin towels are carefully placed, so that sutures, etc., may not come in contact with the skin. The fascia and fat are incised and the joint opened. Blunt retractors may be placed within the joint to permit a view of the cartilage. If it is torn at the anterior end, the anterior two-thirds of the meniscus should be removed. It is seldom necessary to remove more than the anterior four-fifths of the cartilage; three-fifths is usually sufficient. Care should be taken not to divide the internal lateral ligament. In the removal of the cartilage from its attachment to the capsule in the region of the internal lateral ligament, a little rim of cartilage may be left on the capsule, and thus any injury to the fibers of the ligament will be avoided.

After the removal of the meniscus, the wound is closed layer by layer with plain catgut, using interrupted sutures. The skin is closed with silkworm and horsehair. A fairly heavy cotton dressing is put on firmly, and the tourniquet removed. A plaster-of-Paris cast is applied, and worn for seven days. Gentle motion is permitted as soon as the cast is off. All the stitches are out by the twelfth day, and walking is permitted as soon as the patient wishes. If effusion ensues, an elastic bandage is worn for a time.

As a basis for this study the records of 98 consecutive patients operated on in the Mayo clinic have been examined. There were 19 patients between the ages of eleven and twenty years; 42 between twenty-one and thirty; 20 between thirty-one and forty; 15 between forty-one and fifty; and 3 between fifty-one and sixty. Sixty were under thirty years of age. Seventy-seven were males, and twenty-one were females. The right knee was affected in 44 instances, and the left in 54. The internal semilunar was removed in 94, and the external in 4 instances.

In a number of instances (18), although there was a more or less clear-cut history of locking with the typical train of symptoms, the cartilage, at operation, appeared normal except for a little too much mobility involving the capsule in that area. Nevertheless the cartilage was removed. In four of these 18 cases the results were excellent, and in four the results were generally satisfactory in that practically all the symptoms were relieved. In three of the group of 18 patients the results are unknown. In seven the results were unsatisfactory.

In nine instances the semilunar was removed in persons operated on for free osteocartilaginous bodies. This was done in the earlier cases, and in some, at least, was probably not necessary. The results, however, were all excellent.

In 13 instances the histories were insufficient to permit of any classification as to the type of injury to the cartilage, but the results were satisfactory in nine and unsatisfactory in four, showing that the paucity in the notes, at least in some cases, was probably due to paucity in the pathologic condition.

In 58 cases of the series a torn and misplaced cartilage was found. The notes in some of these did not show the exact location of the tear, but in 21 it was definitely stated that the middle three-fifths was torn longitudinally, separated from the capsule, and lying in the intercondylar notch. This is the bucket-handle type of fracture so aptly named by Sir Rutherford Morison.

The results in this group were excellent. It is more than probable that some of the early cases in which the surgical notes showed merely misplaced or loose cartilage were in reality torn cartilages.

PAROTITIS AS A POSTOPERATIVE COMPLICATION.

COLLINS (*Surgery, Gynecology and Obstetrics,* April, 1919) found that in six thousand one hundred patients who had been operated on, seven had developed parotitis, and one patient developed parotitis and died while waiting for operation. He quotes Rolleston and Oliver to the effect that secondary parotitis may complicate cases of gastric ulcer treated medically by oral starvation.

That it occurs ten and a half times more frequently in such cases of gastric ulcer than in cases allowed fluid by the mouth.

That it is an outcome of the dry condition of the mouth, and that mouth-washes do not prevent its occurrence.

That is more often unilateral than bilateral.

That suppuration occurs in about one-fourth of the cases, and that this constitutes a grave complication.

Frank discusses the same question and comes to the following conclusion: It is highly probable that secondary parotitis is due to an ascending infection of Stenson's duct.

The onset of this complication may be prevented by attending to the following details: (*a*) mouth carefully cleansed before and after operation; (*b*) everything used for the anesthetic should be sterile; (*c*) the anesthetist should avoid pressure on the gland while attempting to elevate the jaws during anesthesia.

When the swelling does not show any tendency to decrease in size in about four days it is advisable not to wait for fluctuation, as the location of the pus is beneath the dense parotid fascia. Therefore free incision and drainage should be resorted to early.

Postoperative parotitis is more apt to occur after abdominal operations than operations on any other part of the body.

Its development is favored by a dry condition of the mouth and a lack of fluids of the body.

The infection usually ascends through Stenson's duct.

In patients whose abdominal condition makes it necessary to withhold food and drink from the mouth and stomach for a time, prophylactic treatment should be instituted.

The mouth should be kept clean and moist by its own secretions and the body should be abundantly supplied with water.

SURGICAL TREATMENT OF EMPYEMA.

MOSCHCOWITZ (*Surgery, Gynecology and Obstetrics,* April, 1919) contributes the result of a study of empyema, opportunities for this having been afforded by his appointment to the Empyema Commission, which directed his energies toward the clinical and laboratory research of material afforded by the incidence of pleural infections in the various cantonments in this country. He, in 1914, tabulated the statistical results in 299 consecutive cases observed in Mt. Sinai Hospital, New York, during the preceding ten years, and discovered that the mortality reached the formidable figure of 28 per cent. This, his last paper, is based entirely upon his experience of 140 cases observed first in Camp Lee and subsequently at General Hospital No. 12, Biltmore, N. C.

The vast majority of these empyemata were due to infection by hemolytic streptococcus, and were coincident with or followed a peculiar form of organizing bronchopneumonia, which in turn frequently followed measles. Except in the early stages these empyemata did not differ very markedly in their clinical aspects from those observed in civil practice, except as to the extremely rapid formation of the pleural exudate and the still more rapid formation of myriads of streptococci, the latter due to perforations.

Whenever there is a suspicion of an exudate into the pleura, its presence and character should be verified by exploratory aspiration. In the early stages this fluid is varicolored and only slightly turbid; occasionally it is sanguinolent. The early turbidity is only partially due to the presence of pus cells, although a number of these can be discovered in microscopic examination; more frequently it is due to the presence of myriads of streptococci. As already stated, the exudate usually teems with streptococci, but, peculiar as it may appear, the streptococci, in spite of the apparently excellent nutritive medium, not only do not multiply, but on the contrary they frequently disappear altogether; and large bottles of exudate may keep sweet for an indefinite length of time.

The most important advice which the commission offers as regards the treatment of these empyemata during this stage is not to operate. When the fluid causes a serious embarrassment of the respiration and circulation, as evidenced by dyspnea, cyanosis, and rapid pulse, it should be relieved very promptly by evacuating it with a Potain or Dieulafoy aspirator. This procedure should be repeated as often as indicated, if necessary even daily. In rare instances this procedure may even be curative. Exception to this rule of non-operative treatment is made only in cases of acute and progressive hydro- or pyopneumothorax which result from the rupture of a large subpleural pulmonary abscess, communicating with a bronchus of considerable size. In these very prompt operative interference is indicated.

This recommendation of delayed operation is based upon the marked improvement in the mortality statistics since the adoption of this course, which justifies its adoption, as does also, by contrast, the very high mortality in camps in which operations were undertaken promptly upon the discovery of the infected exudate.

When after the formative stage operation is indicated this should be done under local anesthesia and nearly always through a simple intercostal incision, drainage being secured through a single large-sized rubber tube, the pus being slowly evacuated. Thereafter Dakin's solution is instilled through this tube by means of a T-connection which leads all the drainage into a reservoir and allows the flow of Dakin to occur by simply loosening a clamp. Moreover, the column of fluid passing down into the container into which pus flows produces a negative vacuum. Thereafter Carrel tubes are introduced into the cavity and a complete dressing is applied every twenty-four hours, the Dakin solutions being repeated in the interval according to indications. Later on exercises are given.

As regards chronic cases of empyema, the author observes that empyema cavities can be rendered bacteriologically sterile by means of Carrel-Dakin treatment, and that the drainage opening can then be closed by secondary suture. A certain amount of exudate occurs, although not to the full extent of the cavity. In the course of time this secondary exudate becomes absorbed, and is replaced by the slowly expanding and adhering lung.

A very definite closed pneumothorax may disappear, the lung expanding and completely replacing the air. Empyemas which originally secreted large amounts of pus, leaving only a small sinus leading into a large cavity, may be characterized by a very trifling discharge through the sinus, the latter ultimately closing up and remaining closed. Moreover there are some cases which do not heal under Dakin's solution and which promptly close on stopping the treatment.

Beck, dealing with the same subject, concludes a long and interesting paper with the following summary:

The treatment of empyema has, through the occurence of new types, become a new problem, and on account of its enormous prevalence will require a revision and modification in methods of treatment.

The correct treatment of the early stages will prevent the majority of the chronic suppurative sinuses.

When sinuses persist in spite of all previous treatment the bismuth paste, if correctly applied, will eliminate approximately 80 per cent of such cases.

The residue of such cases as are not amenable to the bismuth treatment may be cured by the skin-sliding operation, provided the technique is followed as outlined in this paper.

Sherrill, from his observation of over one hundred cases in army hospitals, recommends the following as the most satisfactory method of treatment yet offered:

Diagnostic tap as soon as the presence of fluid is suspected. This should not be repeated with unnecessary frequency, owing to the likelihood of the development of empyema. If the fluid is at all cloudy, an injection of one ounce of a 2-per-cent formalin solution is advisable at this time, a culture of the fluid being taken before injection.

If there is evidence of pus in the chest cavity, aspiration with the injection of one ounce of a 2-per-cent formalin and glycerin should be made. This solution should stand for twenty-four hours before use, because it takes sixteen hours for a complete solution. This injection should be repeated every third day, the pleural fluid having been removed prior to the injection. Care should be observed that the aspirator needle is in the pleural sac, otherwise considerable pain will result from injection into the soft tissues of the chest wall. Within a week this method will usually clear up the purulent condition, and with the assistance of breathing exercises will promptly restore the patient to a duty status. The great advantage of this method, which was first proposed by John B. Murphy, lies in the fact that the condition does not become chronic, and therefore the lung does not remain collapsed but distends to fill the chest cavity as the clear serum, remaining after treatment, is absorbed.

Failure to clear up the pus by this method may be followed by open operation, either thoracotomy or costatectomy, which can usually be accomplished under local anesthesia. However, he has found that the administration of chloroform in no way prejudices the chances of recovery. Open operation should not be done until the pneumonic process has subsided. The objection to thoracotomy lies in the fact that close proximity of the ribs impairs drainage and makes likely rib necrosis from pressure of the tube.

Cases which come to the service already chronic with pleural adhesions and pocketing of pus cavities will demand the removal of portions of one or two ribs and the separation of the pleura from the chest wall by the hand of the operator. The insertion of some form of drainage, which will provide for a negative intrathoracic pressure, should be employed. He has found the combination consisting of a stiff rubber tube, one-half inch in diameter, connecting with a collapsible rubber tube, just large enough to fit over it snugly, draining into a bottle, to be most satisfactory. This allows the escape from the chest of pus and air, but prevents any air entering through the tube, making an automatic pump which permits the gradual distention of the lung and obliteration of the suppurating cavity.

The use of the Carrel-Dakin fluid will remove the large amounts of lymph which are so frequently found in these cases. It will diminish the odor, lessen the discharge, and oftentimes entirely sterilize the cavity. This will permit closure of the wound, as soon as the bacterial count shows the cavity to be surgically clean. The author did not think it had any advantage as an antiseptic in these cases over formalin and glycerin. A valuable method of its employment is the insertion of a small rubber tube through a stab wound which will diminish the necessity for dressing and enable one to put in the chest cavity any antiseptic solution which may be desired and to withdraw the same, at the same time establishing negative pressure within the chest.

In the very old cases, one of the well-established very radical operations should be employed, but only after the injection of formalin and glycerin into the chest pockets and plugging of the drainage tract, as this will in the great majority of cases result in a cure.

Beginning just as soon as the patient is able to be out of bed, graduated exercises should be employed to encourage the distention of the lungs.

POSTOPERATIVE SEQUELÆ OF ACUTE APPENDICITIS.

DEAVER (*Pennsylvania Medical Journal*, March, 1919) reports that in 1700 operations for acute appendicitis collected from recent records at the Lankenau Hospital of Philadelphia, sixty-six deaths gave a mortality of 3.7 per cent. The series included all cases of acute appendicitis with and without preoperative complications directly due to the condition of the appendix or to the involvement of other viscera.

The more frequent postoperative sequelæ requiring one or more subsequent operations were fecal fistula, secondary abscess, and intestinal obstruction, as follows: Fecal fistula, 42, with 6 deaths; secondary abscess, 30, with 6 deaths; intestinal obstruction, 27, with 11 deaths. To these postoperative conditions Deaver limits his discussion.

In addition to the above there were six operations for fecal fistula following acute appendicitis, the original operations having been done elsewhere; one death falls in this group. There were also 28 additional postoperative fecal fistulæ, 22 of which closed spontaneously, four were still open when the patient left the hospital, and there were two fatal cases with the sinus still open at death. One of the latter developed two fistulæ, one of which closed spontaneously. Altogether, then, there were 76 cases of fecal fistula and 10 deaths.

From this it appears that the incidence of this postoperative complication of acute appendicitis is about 4.4 per cent, with a mortality of 14.7 per cent, and that 2.8 per cent require secondary operation, the mortality of which is 16.6 per cent (48 operations, 10 deaths).

Of the 48 patients operated on, 27 developed the fistula during convalescence from the appendix operation, the secondary intervention taking place as early as the third and as late as the sixty-third postoperative day. In the majority of instances, however, the first signs of the fecal discharge appeared during the second week.

Only one of the patients in this group came to the hospital and was operated on within twenty-six hours of the onset of symptoms of appendicitis.

We may also expect fecal fistula to follow when the pathology precludes a complete and perfect operation in the treatment of the acute appendix—as, for example, when the latter cannot be removed, as happened in six of Deaver's cases; or where it has ulcerated off (two cases); or where the stump of the appendix cannot be inverted (ten cases); or where it can only be partially removed. This is again well illustrated in a case in which the median third of the appendix had perforated, the proximal third was buried beneath coils of ileum, and the distal third broke off spontaneously during manipulation; or, as in another instance, where the appendix was tied up in a mass with the ileum and the cecum and could only be removed in pieces.

While the precipitating cause of postoperative fecal fistula is acute appendicitis its immediate cause is without doubt abscess formation, and the pressure of drainage tubes on the intestines, especially where a septic condition gives rise to ulceration of the bowel, may produce pressure necrosis with the formation of a fistula as the result.

It is only in cases that come to early operation that we are able to dispense with drainage. Sixty per cent of the cases that develop postoperative fecal fistulæ require the use of more or less extensive drainage at the original operation. Further comment seems superfluous.

A favorite theory that the greater number of secondary abscesses develop in the pelvic region and that they are due to the

routine use of the Fowler position after operation is not borne out by the present series. The secondary collection was found in the subphrenic space more often than in the pelvic region, the incidence of subhepatic and subdiaphragmatic collections being about equal. The prognosis of postoperative abscess in the subphrenic space, however, is not so good as when the secondary collection develops in the pelvic cavity; five of the fatal cases belonged to the former group.

A study of the pelvic secondary collections indicates the fault to be due, not to the Fowler position but to late operation, incomplete operation, and insufficient drainage. The connection between the generative organs and the appendix is too well known to require further elucidation at this time.

All of the subphrenic secondary collections were pus cases at the original operation. Primary subphrenic abscess is unknown. It is practically always due to infection within the abdominal cavity or the peritoneal cavity, and in the majority of cases is associated with disease of the appendix or with the operation as a result of that disease.

It is well known that infection from the appendix may extend to nearly all the subphrenic spaces and fossæ and beyond, and that this extension may take place up the lumbar peritoneal fossæ from the pelvis; or by way of the portal vein; or by lymph extension, the latter being probably the most frequent route and at the same time the most fatal. It is not surprising, therefore, to have so large an incidence of subphrenic secondary collections and likewise to find the infectious process passing beyond the confines of the subphrenic space to the lungs, as happened in one of the fatal cases in the group that came to operation on the third day of the disease.

This tragic postoperative complication of acute appendicitis occurred in Deaver's experience in about 1.5 per cent of cases and presented the high mortality of 40.8 per cent (27 cases, 11 deaths). (The original operation in four was done elsewhere.) He was more fortunate with the children's cases, in which he had thirteen consecutive operations for intestinal obstruction without any deaths. These are not included in this series. Many of the patients were doing apparently well after operation when the symptoms of obstruction suddenly developed. About 30 per cent made a more or less uneventful operative recovery and developed the obstruction from one month to four years later. They usually gave a history of comparative freedom from symptoms until the sudden attack of ileus appeared, or, in other words, until adhesions formed a band, or contraction of adhesions caused a kink or volvulus of the intestines and produced the classical symptoms of progressively severe pain, vomiting, visible peristalsis, distention, and complete constipation.

An analysis of the cases shows that fully 70 per cent required drainage at the original operation. There is no doubt that every case of acute appendicitis requiring drainage can safely be taken as an indication that operation was delayed beyond the most favorable moment.

Acute appendicitis is not only a most serious disease, but also a highly insidious one, and for this reason we cannot hope to have a negligible mortality, nor 100 per cent uneventful recoveries. We can and do present better results than the internists because the removal of the appendix at early operation at the hands of the skilful and experienced surgeon gives reasonable assurance of the removal of a focus of infection whose undermining and far-reaching effects are so unbounded, and some of which have been briefly outlined in this discussion.

In practically every case of death from appendicitis some one is to blame. The question is: Who is at fault? Is it the wise and experienced parent or guardian or friend who refuses to consent to, or advises against, operation because he has had his appendicitis frozen out, or is it the ill-advised administration of an aperient or purge, or is it the doctor? It is too often the latter. Summing up the facts will undoubtedly show that purgation is the pri-

mary cause of the complications we have been discussing, and late operation the main contributing factor. We know that war is hell, and so is purgation in appendicitis.

VINCENT'S INFECTION OF THE PENIS.

BOND (*Urologic and Cutaneous Review*, April, 1919) observes that several sporadic cases of Vincent's infection of the penis have been described in the literature. Similar lesions are described in the later works on urology and are called an erosive balanitis, a gangrenous balanitis, and by Cabot of Boston the fourth venereal disease. The writer believes that these conditions are one and the same and that they are still more common than usually recognized.

The etiology of the foregoing conditions and Vincent's angina are the same. There is a symbiosis of a vibrio and a fusiform bacillus, these organisms being easily demonstrated in the secretions. They occur also in noma, pulmonary gangrene, furuncles, and in healthy persons around carious teeth. They are apparently non-pathogenic except under anaerobic conditions.

The bacteriology of these legions as furnished the writer by Dr. M. King, Professor of Bacteriology in the University of Arkansas, agrees with that of Brooks and Morton and is as follows: Smears made from genital lesions, the so-called "fourth venereal infection," showed typical spirilla and fusiform bacilli, identical morphologically and in their staining characteristics with the organisms described by Jordan as occurring in infections of the mucous membrane of the mouth and throat, giving rise to lesions in these areas variously known as ulcer-lesions, membranous angina, stomatitis, Vincent's angina, and pseudomembranous angina. Smears from lesions of the oral cavity following salivation also showed the same organisms. The anaerobic fusiform bacillus found in each of these cases is a long, spindle-shaped rod with tapering ends. Occasionally the bacillus stained irregularly, appearing in some instances to be divided in the center, thus forming two individuals with their ends approximated. Slender spirilla, 10 to 12 microns in length with pointed ends and with three or four turns, were also found. Associated with these were the so-called vibrio or spirillum described by Flügge as of greater diameter than the spirillum of Vincent's angina and with less well-defined undulations.

The predisposing causes are a long prepuce and lack of cleanliness, which allow the secretions to accumulate. This devitalizes the mucous membrane and makes a favorable culture medium for the bacillus and vibrio.

The methods of inoculation are perhaps both direct and indirect. Coitus oris is the most plausible of the direct causes, although Bond states that he has never been able to obtain a confession of this from a patient. Indirect inoculation comes from wetting the penis or labia with saliva from an infected mouth. He states that he has had repeated confessions of this from both men and women. One man first denied very strenuously such a source of infection, but later told him that the woman had (unknown to him at the time) spit in her hand and wet his organ because it did not enter easily.

The incubation period is from three to five days. The lesions usually begin on the glans as slight erosions with little or no induration. The edges of the ulcers are irregular, later becoming slightly undercut and ragged. The bottoms slough and are covered with easily detachable, grayish-purple membranes. The secretion is dirty-grayish in color and the odor is fetid. The prepuce becomes edematous, usually causing a phimosis. The inguinal lymph nodes are involved in exceptional cases, usually without suppuration. There may be a lymphangitis. Although sometimes there is some malaise and the temperature may go to 101° or 102°, usually there are no other general symptoms.

The organisms being anaerobic gave the writer a clue as to the treatment.

The use of hydrogen peroxide applied locally and gently injected under the foreskin with a long-nosed urethral syringe is

usually sufficient. Full-strength turpentine and touching the ulcers with tincture of iodine occasionally also gives very good results. If these methods do not suffice it is necessary to make a dorsal slit in the prepuce. This causes a temporary extension of the lesions, but renders them far more accessible and amenable to treatment.

HYPERPLASTIC ETHMOIDITIS—DIAGNOSIS AND TREATMENT.

MAYBAUM (*New York State Journal of Medicine,* April, 1919) observes that the causative factor of hyperplastic ethmoiditis depends upon a protracted and more or less continued disturbance of nutrition of the ethmoid labyrinth rather than upon inflammatory changes with bacterial invasion—in other words, interference with the normal ventilation and drainage from obstructive lesions in and about the middle meatus would seem to justify the suspicion that this is the predominant factor. There is usually a history of repeated attacks of acute rhinitis, the process in the nose having subsided, while the mucous membrane covering the ethmoid wall and outer surface of the middle turbinate, owing to defective drainage and existing thickenings from previous attacks, does not return to the normal; from constant irritation of secretion and because of the passive hyperemia, the mucous membrane undergoes hyperplasia. The condition at first is confined to the nasal wall of the ethmoid, eventually spreading to the ethmoid cells themselves. Because no pus or polypi are seen in the nose and because the chief symptom is a profuse watery discharge, the examiner excludes, or rather overlooks, the possibility of ethmoiditis being present and places the trouble in the class of cases of nervous irritability of the nasal mucous membrane, vasomotor disturbance, or possibly a manifestation of hay-fever.

Primarily hyperplastic ethmoiditis is a non-suppurative disease, though a superimposed infection may at any time alter its character temporarily or permanently.

The symptoms by which hyperplastic ethmoiditis can be recognized are usually quite characteristic and fairly definite. The patient complains of constant or frequently recurring colds in the head not influenced by ordinary treatment. Paroxysmal attacks of sneezing, especially on rising, accompanied by profuse, watery discharge from the nose, are frequent complaints; the profuse discharge necessitates the use of half a dozen or more handkerchiefs daily; no stain, however, appears upon them, differing in this regard from the purulent form. After a time probably the most constant and disturbing symptom is headache, frequently described as burning or boring between the eyes, or it may be supraorbital. The headache accompanyinig this trouble may be more severe than in any form of sinus infection. The author has had a number of undoubted cases of hyperplastic ethmoiditis in which this symptom was entirely absent, the patient simply complaining of a slight sensation of fulness or pressure in the upper part of the nose. On the other hand, this form of ethmoiditis may be responsible for a number of headaches varying from fulness over the bridge of the nose to severe pain over the entire head, without other definite signs or symptoms. Among eye symptoms complained of are fulness in the eyeballs, pain on reading, so-called weakness of the eyes, scotoma, and especially increased lacrimation. The orbital manifestations of chronic hyperplastic ethmoiditis are interesting because of the obscure picture which they often present. They are usually of mechanical origin and are to be expected when we recall that the orbital and nasal cavities are supplied by the same sensory nerves. This affection on the other hand may run such a latent course that the patient consults us on account of other conditions, as disturbance of olfactory function, pharyngeal affections, tinnitus or impaired hearing—all of these taking their origin from this disease.

At the outset there may be but little discernible except hypertrophy or anemia of the mucous membrane of the middle turbinate, of the area directly anterior to it and of the middle meatus, though careful in-

spection may reveal a beginning local polypoid change in the anterior end or the lower border of the middle turbinate. Uffendorde places special emphasis, as a sign of diagnostic importance, in fact almost pathognomonic of hyperplastic ethmoiditis, on the soft, edematous condition of the mucous membrane of the outer surface of the middle turbinate. Occasionally one or two small polyps in the cleft between the middle turbinate and outer wall of the nose may be the only objective evidence of the disease. The appearance of polypi or polypoid swelling in the nose proper depends entirely on the position of the middle turbinate. If this structure lies close against the lateral wall of the nose (normal position), the ordinary macroscopic examination will disclose nothing abnormal, unless the disease has progressed for a long period of time.

The treatment to be adopted will depend upon the stage of the disease. Conservative treatment is useless after the disease has fully developed. In the earliest stages, when the condition of hypertrophic rhinitis is present, every effort should be made to promote and maintain proper drainage and ventilation of the ethmoid and other sinuses. Correction of a deviated septum, especially a high deflection, removal of hypertrophied anterior end of the middle turbinate when present, are indicated and may be regarded as conservative measures. Very often the improved ventilation of the ethmoid cells is all that may be required to bring about a cure of the earliest stages of hyperplastic ethmoiditis. In cases somewhat more advanced, removal of the anterior ethmoidal cells with curette and punch forceps, leaving the middle turbinate intact, not only provides the desired drainage and ventilation, but removes the polypoid tissue and diseased bone, and at the same time leaves a considerable amount of healthy tissue in place, which is desirable for the welfare and comfort of the patient. Where the polypi are large and few in number and spring from the middle turbinate, pointing to the possibility of healthy underlying bone, simple snaring of these growths may suffice. It is a reprehensible practice to snare polyps without investigating the condition of the bone by means of a nasal probe.

The roof of the ethmoid labyrinth is formed by the floor of the anterior cerebral fossa. The bone forming this wall is rather firm as compared with the much more fragile cribriform plate and orbital wall. It is especially important to remember the relation existing between the ethmoid cells and the cribriform plate. The bony wall forming the roof of the labyrinth joins the cribriform plate, but at no point do the ethmoid cells come in contact with this plate. The cribriform plate forms the roof of the meatus naso communis. In order, therefore, to avoid perforating this delicate structure when operating on the ethmoid labyrinth, it is important to keep out of the olfactory fissure. This is best accomplished by allowing the nasal wall of the labyrinth and the middle turbinate to remain until the exenteration of the ethmoid cells has been completed, when both of these structures may safely be removed. Particular care should be exercised in manipulating with the curette in the anterior space between the septum and the outer nasal wall.

As to the after-treatment: No packing is left in the nose; a piece of sterile cotton may be loosely fixed in the nostril and changed when necessary. The nasal cavity is left alone for three days, and then as the reaction passes off it can be cleaned with a warm alkaline solution so as to facilitate the expulsion of blood-clots and the removal of semidetached tags. During the after-treatment the operator is sometimes disappointed to note what appear to be masses of recurrent polypi, but in many instances these are simply composed of edematous mucous membrane and subside as soon as the reaction has passed. The results of the operation are highly satisfactory, especially in cases in which there is no suppuration in the adjoining sinuses. If a few polypi are found some time later to have escaped removal, they can early be dealt with under cocaine. If suppuration

in the adjoining sinus is present this is now more amenable to treatment and cure with lessened likelihood of recurrence of polypi. Following an ethmoidectomy any tendency toward dryness of the nose after healing seems to be successfully prevented by compensatory swelling of the inferior turbinate.

CLINICAL SYMPTOMS OF CHRONIC INTESTINAL STASIS.

LANE (*The Practitioner*, March, 1919) observes that in the large majority of cases the symptoms complained of are those which result from a distention of the small intestines, duodenum, and stomach, produced by the damming back of their contents and by the chemical changes they undergo.

The delay in the passage of the intestinal contents originates in the pelvic colon, and extends through the length of the large intestine.

The accumulated stagnating contents of the small intestine may produce symptoms which are entirely mechanical in origin. They result from the abrupt angulation and the consequent obstruction of the duodenojejunal junction, which is brought about by the drag exerted upon it by the abnormally loaded small intestine. The symptoms and conditions producing them are caused by the overdistention of the duodenum; the spasm of the pylorus, the distention of the stomach, the changes in the mucous membrane of the duodenum and lesser curvature, and the similar changes developing in the mucous membrane about the obstructed pylorus, are due to the violent impact of food as the stomach endeavors to expel it forcibly from its cavity.

In the recumbent position, the elongated pelvic colon evacuates its contents more readily than in the erect posture, while there is no longer a prolapse of the transverse colon tending to obstruct this portion of the bowel at the attachment of the ligament which develops to connect it to the gall-bladder and at the splenic flexure.

The cecum does not fall so deeply into the pelvis, and its rotation with the consequent torsion of this end of the ileum, which Dr. Jordan has described and demonstrated with such remarkable clearness, does not take place.

The flow of the gastric contents through the spasmodic pylorus improves steadily, and after a time all evidence of spasm at this aperture disappears.

The dilatation of the stomach and the spasm of the pylorus improve much more slowly than does the condition of the duodenum, which subsides with remarkable rapidity in many instances; consequently, it is obvious that one cannot expect an ulcer of the stomach, whether situated at the pylorus or on the lower curvature, to react with anything like the rapidity of a duodenal ulcer. A peptic ulcer is three times more difficult to produce than a duodenal ulcer, and is correspondingly much more tedious to cure.

In order to meet the prolapse of the viscera and the consequent angulation of the bowel at the several points at which it is fixed, great benefit may be obtained by pressure exerted on the lower abdomen in such manner as to tend to keep the viscera up. An encircling belt does not do this effectually, since it serves to increase the intra-abdominal tension by its lateral pressure. A stay increases still further this defect.

On the other hand, the greatest advantage can be obtained from a support which acts on the lower abdomen only. This should press on the abdomen below the umbilicus.

The best form of support is that called the Curtis belt, which has been constructed for the purpose. It is of the nature of a truss, with a counter-pressure behind and springs which control a central plate. This pressure meets the tendency to prolapse of the viscera in the erect posture. It also controls the veins in the splanchnic area, and by tending to keep blood up in the brain obviates that feeling of exhaustion or tiredness of which these patients complain so much.

It is surprising how many cases of stasis can be relieved by these very simple means.

If paraffin is taken at a suitable interval before a meal it precedes it in its way through the tract. It facilitates the passage of the intestinal contents through the several points where they are likely to be held up by a mechanical obstruction or by spasm of a reflex or inflammatory origin. It therefore tends to overcome the delay of the material in the small intestine and also to hasten the passage of feces through the large bowel. The advantage which paraffin affords is well demonstrated by its enormous sale all over the world. The radiologist is also well aware how difficult it is to obtain any accurate record of the passage of material through the gut—if the patient is taking paraffin. To do so, paraffin must be given up for about ten days before an examination is made.

EXTRACTION OF METALLIC FOREIGN BODIES WITH FORCEPS UNDER DIRECT X-RAY CONTROL.

ROBIN (*United States Naval Medical Bulletin,* Volume XIII, No. 2) observes that the method which forms the subject of this paper is so simple as to be applicable to most cases. The following principles, however, should always be kept in mind:

All the wounded passing through a hospital, whether their lesions be recent or old, should be examined from head to foot by radioscopy in order to determine the presence or absence of foreign bodies. It often happens that men keep silent about foreign bodies, especially if their papers state that the missile has been extracted.

Any foreign body of the soft parts, no matter how small, should be removed for two reasons: (*a*) It may be the seat of latent infection or the source of acute developments in the future. (*b*) Even if the foreign body be well tolerated, the patient may make it a pretext for exemption from work or duty, or even for pension or passage to an auxiliary service. Every foreign body, then, even if it be no larger than a pinhead, should be removed.

The anatomical localization is obtained by studying the respective displacements of the foreign body on the one part and of the organs of the neighborhood, chiefly bones, on the other part, while the body is being rotated from one side to the other.

The shadow of a foreign body situated in front of the general axis of rotation will displace in the same direction as the part of the body which is next to the screen and in an inverse direction to the part of the body nearer the screen. If the foreign body is behind the axis, the contrary will take place. Besides, it is evident that the displacement of the shadow is more rapid when the foreign body is more distant from the axis of rotation.

During the rotation the shadows of the skeleton move also. The relative displacement of the shadow of a bone and the image of the foreign body is considerable when they are widely separated; if during the rotation bone and foreign bodies keep at the same distance and move in the same direction, one may say that they are near each other.

A lot of information may be obtained by comparing the displacements of the foreign body with the physiologic movements of the thorax. Everybody knows that during inspiration the diaphragm goes down and the ribs go up. Hence if an intrathoracic foreign body follows exactly the movements of the diaphragm, but at a distance from it, one can be sure that it is intrapulmonary. If, on the contrary, it goes up and down with the ribs, it is depending on the ribs. Then we use the method of rotation to find out if it is extra- or intrathoracic; in the latter case, it is either pleural or corticopleural with pleural adhesions.

Foreign bodies near the mediastinum are not very mobile, but by rotation we can see at once what their position is inside the thorax. Foreign bodies near the heart are the seat of transmitted beatings from the heart; rotation will allow us to see if they are near, on, or in the pericardium.

The systematic extraction of foreign bodies would not be possible, if each one had to be reached by a large incision which

opened widely plane after plane of fascia and muscle.

Extraction under the direct control of the *x*-ray, with forceps passed through a small buttonhole in the skin, is most rapid, practical, and safe. The criticism that it is a blind method does not hold good and is only raised by those who do not know this method, or have failed in its application.

Eight or ten foreign bodies of the extremities at different depths can be removed in a half-hour; this time including sterilization of the skin in different areas. Usually 5 cubic centimeters of ethyl chloride will provide sufficient anesthesia for the removal of a foreign body from a thigh or from a leg at any depth.

A radio operating-room with red light or feeble white light, alternating with full light, artificial or natural, is needful, together with a knife, and artery forceps or foreign-body forceps of different sizes.

Robin uses the table of le Coniac, which consists essentially of a plane revolving around its long axis. The patient is firmly fastened to the rotary table, so that he may be turned from right to left and inversely around its axis without falling off. The radiographers use Piloris tubes; a Coolidge tube would be better. The tube can be moved in a horizontal plane beneath the rotary table. Diaphragming is rapid and easy. The position of the foreign body is ascertained. The patient is placed on the movable table in the best possible position for the operation. The inhalation of ethyl chloride will furnish sufficient anesthesia for a short, easy extraction. If the operation is to be long, if there are several missiles to be removed from the same patient, or if complete immobility is necessary, chloroform or ether may follow.

The surgeon, when his eyes have become accommodated to the dark, asks for the rays. The radiographer centers the tube and the diaphragms. Both look through the screen. The surgeon, placing the point of his knife on the shadow of the foreign body, asks for red light or feeble white light. Then, using his anatomical knowledge, he chooses his avenue of approach, and, as a rule, makes his puncture a trifle to the right of the foreign bodies.

The puncture is made. This is a small, buttonhole incision, not more than half a centimeter in length, and divides skin, subcutaneous tissue, and fascia. The forceps is now introduced through the puncture in the direction of the foreign body. As a rule, an artery forceps is used. Kocher's forceps may be used in some cases, but the teeth are liable to catch in the tissues. Some deep foreign bodies require long bullet forceps.

The surgeon asks for the rays as soon as the forceps is in the incision, and through the screen he watches it as it penetrates the tissues, and he advances it gently but firmly. When the tip of the forceps reaches the shadow of the foreign body, if the surgeon does not feel or does not see the contact with it, a localizing test must be made to learn whether the tip of the instrument is too deep or too superficial.

The surgeon immobilizes his hand on the skin and his forceps in the patient's tissues so that each displacement of the table will be transmitted completely to everything lying over it. The radiographer now indicates the direction in which the surgeon is to move, while both of them watch the respective displacements of the shadows. When the tip of the forceps and the foreign body are on the same vertical line, if the table be made to rotate, that shadow which moves more rapidly in the direction of the rotation is the more superficial. By one or two rotary movements the surgeon ascertains whether his forceps is too superficial (between the foreign body and the skin) or too deep (between the foreign body and the table).

When once the surgeon's forceps has reached the foreign body he will use it as a grooved stylet with which to separate the foreign body from the surrounding tissues. After months have elapsed a foreign body is included in a mass of fibrinous tissue. As a rule this decortication is easily made.

When the surgeon has achieved the "metallic contact" and the foreign body is free, he fixes it by pressing it against sound tissue, and, opening the blades of his forceps, he catches it.

As a rule the foreign body is withdrawn with ease, but occasionally a slight twist is necessary in order to break its last connections with the surrounding tissues.

No suture is used, merely a dry dressing, which is removed in three days.

This method of extraction is simple and very rapid when the surgeon has acquired a little experience.

Since the first extraction from the lungs made by Petit de la Villeon, with Dr. le Coniac as radiographer, in 1915, more than 200 foreign bodies have been removed at Brest. The method of extraction from the lungs is the same as for all foreign bodies, with some modifications in technique; it is only a special application of the general method.

Without entering into the details we may say that—

A very accurate localization must be made.

Skin and intercostal space are cut by an incision not longer than a small buttonhole.

A long forceps (ordinary bullet forceps or, better, forceps with crocodile jaws) is introduced and, under the control of the *x*-ray, passes through the two leaves of the pleura without causing pneumothorax, and enters lung tissue. The penetration of a blunt instrument through lung tissue does not cause hemorrhage.

By rotary movements of the table the progression of the forceps to the foreign body is made in one-half inch steps. The radiographer and surgeon are able to appreciate the direction by the displacement of the shadows as described above.

The foreign body is caught and taken out slowly to avoid cutting the lung by the sharp edges of the fragment.

The passage through the skin, if the foreign body be big, necessitates at times enlargement of the incision.

A silkworm suture closes the small wound. Usually a little morphine is given. With very few exceptions there is no hemoptysis or hemothorax. In some cases, when the operation has been done rapidly, we may notice a little bloody sputum for two or three days after the extraction. There is, however, no rise in temperature, and as a rule the patient is out of his bed in less than a week. After a careful radioscopic examination of his chest, to make sure that lungs and pleura have resumed their normal condition, the patient goes back to his work.

This method of extraction of foreign bodies from the lungs must appeal to every surgeon because it is simple, rapid, and safe.

An objection may be made that the hands and face of the surgeon may suffer from exposure to the rays. In answer to this it may be stated: (*a*) The eyes are protected by lead glasses; and besides there is no necessity for the eyes to be directly over the screen. (*b*) As for the hands, the radiographer uses the diaphragm as much as possible, and, as a rule, the forceps only is in the rays. Besides, the surgeon wears heavy, thick rubber gloves (Chaput's gloves). The operator may use Manclair's gloves with lead in them. After two years of intensive radio-surgery the skin of the author's hands is perfectly normal.

NON-SPECIFIC HEMOPROTEIN ANTIGEN FOR THE TREATMENT OF ARTHRITIS.

BROOKS and STANTON (*New York Medical Journal,* March 15, 1919), reporting under this somewhat formidable title, base their study on the use of protein for the treatment of acute and chronic arthritis. The results of the treatment are good, and indicate that we have a valuable remedy for this malady. The protein used was prepared by Brooks for the purpose of combating streptococcus infections. It is made from ox-blood fibrin by peptic and hydrochloric acid digestion, the products of this

digestion being fractionated by precipitation with ammonium sulphate, the first fractions being rejected and the lower ones used. The protein is prepared in a dry state and kept in hermetically sealed glass ampoules. These ampoules are sterilized by heat. When used, the dry sterile powdered protein is dissolved in sterile 0.9-percent sodium chloride solution and used at once by intravenous injection with aseptic technique. In some cases intramuscular injections were made.

It has been noted that old rheumatic cases have cleared up after injections of typhoid serum. Non-specific protein treatment of other diseases has been more or less successful. These matters and the literature may not be discussed fully in the present note. One disadvantage of the typhoid serum treatment is that it often brings on a rather violent reaction with rigors and high fever, depression, and other distressing and even alarming and dangerous symptoms. In the use of this protein no unpleasant reaction has been observed at any time. At first the authors were inclined to doubt the efficacy of the protein because there was no reaction; but it seems that this depressing phase of the process is not an essential feature of antigen action. They have also found that it must be used immediately after dissolving it in salt solution, for in those instances where there was a delay of an hour or more after dissolving the protein in the salt solution before the injection was made, the protein produced no beneficial effects and sometimes caused a slight inflammatory reaction at the point of injection when the injection was made intramuscularly. This was never found to occur when the protein was injected promptly after solution. They believe that the intravenous method is the logical one. There seems to be no danger from it. A large number of tests on animals in various doses showed no untoward results whatever. Afterward it was used on patients with similar results.

Many patients object to intravenous medication, but will readily agree to intramuscular injections. In such cases the authors used double and triple or even quadruple the intravenous dose. It seems that the practical results are about the same. However, there might be some cases encountered which would respond favorably to the intravenous treatment, but would not to the intramuscular treatment, though they have not yet found this to be the case. Furthermore, the matter of dosage does not seem to be very definite. Anywhere from ten to sixty milligrammes seems to do equally well. They use ordinarily twenty or twenty-five milligrammes intravenously and about thirty or forty or more intramuscularly.

They report eight cases, with astonishingly good results.

SHOCK.

Bayliss (*Proceedings of the Royal Society of Medicine*, February, 1919) notes that the low blood-pressure is, in practice, the most important feature of the condition, since it gives a direct indication for treatment. Indeed, one may say in general that, both experimentally and clinically, if the blood-pressure is restored the other symptoms disappear, some with rapidity, others more slowly.

In the course of investigation it has gradually come to be realized that the chief, if not the only really important, factor is a deficiency in the volume of blood in circulation. This applies not only to that form of shock brought about by actual loss of blood out of the blood-vessels, but also to cases in which there is no reason to suppose that there has been any great loss of blood. Apart from the fact that the general symptoms of hemorrhage and shock are very similar, estimation by the "vital red" method of the volume of blood in circulation has shown that it is decreased in both cases. The name "exemia" has been proposed by Major Cannon for the general condition.

It is clear that blood must be accumulated or held up somewhere or other in

dilated regions of the vascular system. Observations made in the course of abdominal operations give no support to the view that there is any significant degree of dilatation of the arteries or veins of the splanchnic area. The region in question must therefore be that of the capillaries. Observations by Major Cannon had already suggested that there is stasis here in wound-shock.

But what is it that brings about such a dilatation of the capillaries? At an early date in the discussion of the problem, it was pointed out by General Cuthbert Wallace that operations involving injury of large masses of muscular tissue were especially liable to produce shock. Experiments by Major Cannon and the writer in the beginning of last year showed that crushing the thigh muscles of cats was followed by a progressive fall of blood-pressure and other signs of shock. He found that section of the spinal cord above the origin of the limb nerves did not prevent the result, whereas clamping of the artery and vein did so. Some chemical product of the tissue injury must then be the responsible agent.

Dale and Laidlaw have described the action of a base, histamine, which has the remarkable effect of powerfully dilating the capillaries, but not the arterioles, and which in larger doses produces a condition of profound shock. There is reason for believing that substances of this kind are produced in injured and disintegrating tissues.

It was found further that massage of the injured muscles in the experiments on cats resulted in accelerated fall of blood-pressure, so that we have an experimental justification for keeping injured parts as immobile as possible, as is done by the Thomas splint in the case of fractured femur.

These injury effects are, of course, intensified by causes tending to depress the circulation, such as cold, anxiety, fatigue, thirst, hemorrhage, and so on.

The indications for treatment seem obvious. The volume of the blood in circulation must be increased. While transfusion of blood itself is the natural means, it is clear that if a satisfactory substitute in the form of an artificial solution could be made, it would frequently be of value.

It has not yet been possible to state definitely what are the clinical signs showing the necessity for blood transfusion, apart from actual determinations of the blood volume and hemoglobin percentage. Some surgeons state that no case failing to react to gum is amenable to blood.

If, however, the delay between injury and treatment has been great, no measures avail. The tissues, especially those of the nerve centers, as shown by Colonel Mott, become so far damaged by the low blood-pressure and want of oxygen that recovery is impossible.

In actual practice the following general procedure may be recommended:

If the patient is cold and fatigued by a long journey, try first the ordinary measures of resuscitation, such as warmth, water to drink, and rest.

If there is little or no improvement in half an hour or so, inject 750 Cc. of warmed gum saline slowly into a vein. This may probably be insufficient in amount; therefore if some benefit is derived therefrom in half an hour, inject more gum saline. If there is no result at all from the first injection, make a transfusion of blood, if available.

Dale, speaking particularly in regard to the properties of histamine, stated that it was of interest, not merely for its own sake, but because it represented a type of activity, common to a large class of protein cleavage-products, formed by partial digestion or bacterial action. Products showing this type of action have been extracted from almost all organs of the body; they are naturally present in great abundance in the contents of the small intestine; and they appear to be set free readily from almost any tissue as the result of injury or even of temporary stoppage of the circulation.

Here was a substance which caused contraction of all plain muscle, including that of the arteries, which yet produced a fall of arterial pressure, not by weakening the heart but by vasodilatation. In larger doses it caused a profound shock-like collapse, of which the central feature was oligemia. The heart continued to beat vigorously, but was almost empty of blood, as were the arteries and the great veins. Loss of plasma into the tissues was indicated by rapid rise in the corpuscular content of the blood, but seldom to such an extent as to account for the apparent loss of volume. Somehow blood had passed out of regular currency. Through the heart and great vessels, and through a large part of the tissues, the circulation was slowed almost to stagnation. A process of exclusion led the author to locate the blood in the capillaries, and to conceive the action of histamine as due to a general loss of the normal capillary tone. The author supposed that under normal conditions only a limited portion of the capillary network is serving at any one moment as a path for the blood, and that the simultaneous opening up of all the potential channels would lead the blood to percolate slowly through the tissues, which would soak it up like a sponge. The outflow into the veins, and therewith the filling and output of the heart, would fall rapidly away; the blood would accumulate more and more at the periphery, yet with so uniform a distribution that there would be no local hyperemia, but merely the slight general bluish congestion of internal organs, and the dusky pallor of the skin and mucous membranes, which is seen in the animal suffering from shock produced by histamine.

Later an investigation in which Dale coöperated with Professor A. N. Richards, of Philadelphia, provided direct evidence in favor of the view that histamine acts by relaxing capillary tone.

This association of capillary dilatation with transudation of plasma represents a generalization throughout the body of a process which, if locally limited, we should recognize as mild inflammation.

Malcolm observes that it seems to be the universal experience of the R. A. M. C. that in conditions of developing shock of a serious type no method of introducing fluid into the body is of any use, and Crile showed experimentally that in such cases saline fluid injected into the veins passed rapidly into the connective tissues. Here again the facts support the view that when the condition described as primary shock is well developed the vessels are tensely contracted, so tensely that they will not yield to any known method of dilating them forcibly. It seems possible that attempts to do so may be harmful at this time. On the other hand in cases in which hemorrhage is the chief feature the greatest benefit has been derived from filling up the depleted vascular system, and the work of Professor Bayliss with a view to deciding the best composition of the fluid to be injected is of great value. As hemorrhage is one of the most serious complications of shock its treatment is indirectly of importance in combating shock. But it should be recognized that this method is mainly and most directly useful as a treatment for hemorrhage when the state of shock is developing.

As soon as relaxation of the vessels begins in a case of shock, which it naturally does when the primary irritation ceases, there is an urgent need for fluid, the blood-pressure will fall still lower, and even greater danger may arise, especially if the patient is moved or if the condition is aggravated by some complication. But fluid is readily absorbed at this time, and it is best introduced subcutaneously. Its introduction in this way may with advantage be arranged even before an operation is begun. Again, of course, if the case is complicated by hemorrhage the treatment for that condition may be necessary.

After an operation recovery is greatly hastened by a continuance of the subcutaneous injection or by an administration of fluid by the rectum or mouth.

Wallace observes that the toxic theory of shock is a seductive one, but pushed to the extreme it seems to land one in a difficulty. If loss of blood, loss of heat, and toxemia be excluded, can it be said that shock will be banished? On this point some other clinical details are interesting.

There are one or two other points that are worth mentioning. Although most shocked patients have a low pressure and a rapid pulse there are some notable exceptions. There is a certain class of case which comes in acutely shocked. After a period of rest and warmth the men improve and exhibit a high blood-pressure, but any operative interference, however, at once produces a collapse, usually fatal. A second class of case is the shocked man with a slow pulse. These cases almost always end fatally. This class of case has a superficial resemblance to the high spinal injury described by Gordon Holmes.

As to the point whether shock as seen in the war is the same as that met with after operation, it would appear that the two are to all intents and purposes the same. In war sepsis, cold, exhaustion and usually hemorrhage are more potent factors than in civil practice. If we subjected our civilian patients after operation to the same conditions as prevail after a man has been wounded, we should see as much shock in civil as in military practice. The nearer a man's condition is to "pure shock," the less can anything beyond "rest" be done for him.

Mott observes that in the cases of wound shock, burn shock, and shell shock, there was evidence of engorged veins of the meninges, and in the substance of the brain associated with venous and capillary stasis. But besides this evidence of stasis there was marked evidence of anemia; for empty collapsed vessels with dilated periadventitial spaces are as frequently seen as dilated capillaries and veins containing blood-corpuscles, or more frequently so. The condition is not unlike that seen in the brains of animals after ligation of all four arteries. The engorged meningeal and other veins may be due to backward flow from the venous sinuses.

The Nissl granules consisting of blocks of basophil substance do not exist in the living cell, but serve to estimate a quantitative change in the cytoplasm. In secondary shock attended by a prolonged anemia there is a tendency to a breaking up of the Nissl granules and to a relative loss of the basophil substance; the nucleus appears larger and clearer than normal. These cases of shock all show this to some degree.

Walker notes that a great many of the men to whom gum had been given in the field ambulances of the Third Army subsequently required blood on arrival at the casualty clearing station.

With regard to anesthetics in shock cases, particularly must one be careful of the false impression of security conveyed by the use of ether. Seen on the operating table, a shocked patient who is receiving ether may appear to be in a fairly satisfactory state: but half an hour or an hour after operation there is, in many cases, a tremendous reaction. The giving of oxygen seemed to be beneficial whatever the nature of the anesthetic employed. Captain Milligan showed also that the giving of oxygen for half an hour, or an hour, or even longer, through a suitable mask after operation, was certainly followed by good results and a rise of blood-pressure.

He tried the effect of applying a tourniquet in suitable cases, with the idea of cutting off toxins from the damaged tissue and preventing their entry into the general circulation, but as a rule the pain caused by the tourniquet was so severe, and so definitely brought in the element of nervous shock, that it was not practical as a routine treatment.

Bond states that by the classification of donors into groups the danger which formerly threatened the patient from the agglutination and destruction of the red cells during transfusion has now been overcome.

But as the result of recent observations in which Bond had used the blood serums of many different individuals, and incubated with these serums the leucocytes from other persons, he has arrived at the conclusion that different blood serums vary much in their action on foreign leucocytes when these are incubated together outside the body.

From conversations with officers serving in the Macedonian army, and especially with those working in casualty clearing stations, Bond understands that gum has not fully maintained its reputation. This may be due, however, to one or possibly two things. It may be due to changes in a stock solution brought about by the hot climate, but it may also be due, as General Wallace pointed out in the case of one of the armies on the western front, to difficulties in getting the men back in the mountainous area, where, owing to the delay, the patients were often in a desperate condition before transfusion could be carried out.

Frankau reports that for the summer months the average death-rate was 3.3 per cent, whereas in the winter months the average death-rate from wounds was 8.1 per cent, or rather more than double the summer rate. This in reference particularly to the effect of cold upon wounded people.

REVIEWS.

A Manual of Exercises for Correction of Speech Disorders. By May Kirk Scripture, B.A., and Eugene Jackson, B.A. The F. A. Davis Co., Philadelphia, 1919. Price $2.

This is a book designed by instructors in speech at Columbia University, and elsewhere, to enable those who have impediment in speech to become fluent. We are glad to note that they give credit to Dr. Makuen of Philadelphia for his pioneer work along these lines. The book is divided in a practical way into fifty lessons, which cover over 200 pages, beginning with the speaking breath, exercises for breath control, and so on to the conclusion, by which time the difficulties are supposed to be largely overcome. The book is copiously illustrated and is distinctly a working manual for instructor and patient. Proper emphasis is laid upon paying attention to the condition of the hearing, the vision, mouth and nose deformities, and nervous states, and we note with approval that the authors quote another writer upon this subject as pointing out that progress in the relief of stammering and kindred conditions is hampered by charlatans who rob the patient and bring everybody and everything connected with the treatment or investigation of stammering into disrepute.

The recognition that these patients should be treated only by those who are specially trained and who have not only elementary but fundamental knowledge concerning speech is one of the advances which has taken place comparatively recently.

Pneumotorax Artificial y Otras Intervenciones en la Tuberculosis Pulmonar. By Dr. Juan B. Morelli. Part I and Part II, Imprenta Nacional, Montevideo, 1919.

These two volumes form an exhaustive work on artificial pneumothorax. They have been prepared by Morelli, the Professor of Clinical Therapeutics of the Faculty of Medicine at Montevideo. They cover more than 600 pages each and contain temperature charts and *x*-ray pictures to illustrate what the author has to say on the subject. So far as we know this work is by long odds the most exhaustive consideration of artificial pneumothorax which has yet appeared in any language. Some of the chapters are marked by a summarization which enables those who have difficulty in reading Spanish to obtain in brief space the views which the author has derived from literature and his personal experience. Possibly to the American and English

reader one of the most valuable parts of the work will be the rather exhaustive bibliography which is printed near its close.

PRACTICAL MEDICINE SERIES. Edited by Charles L. Mix, A.M., M.D. Volume I. General Medicine, edited by Frank Billings, M.D., assisted by B. O. Raulston, M.D., and Bernard Fantus, M.D. Series 1919. The Year Book Publishing Co., Chicago. Price $2.50.

We have so frequently told our readers of the object intended by this Year Book that it is unnecessary for us to repeat a description of its text. The authors or collaborators take from the journals which come to hand the information which seems to them useful to their professional brothers and arrange it in an orderly manner so that it can be readily turned to. Manifestly it has been impossible for Dr. Billings, who has been actively engaged in the Medical Corps of the Army, to give the attention to the present volume which he probably gave to the previous issues, but he has called to his assistance two men who because of their experience are quite competent to edit the volume even if he exercised no supervision.

AN OUTLINE OF GENITO-URINARY SURGERY. By George Gilbert Smith, M.D., F.A.C.S. W. B. Saunders Company, Philadelphia and London, 1919. Cloth, $2.75 net.

This book is an attempt to describe the diagnostic and therapeutic measures available to every medical man and to state definitely the boundary at which the province of general medicine ends and that of urology begins.

Thereafter the author takes up the subject of Technic in a soundly rational and satisfactory manner, laying out the necessary equipment and including the use of the cystoscope. This is perhaps a departure from the principle laid down that the book is intended for general practitioners. Gentle, skilful, safe and serviceable cystoscopy requires long practice and a more extensive armamentarium than are available to the general practitioner. When a cystoscope is needed it should be in the hands of an expert.

There follows a section upon Urinary Antiseptics, one on Urinalysis, and Renal Function Tests. Thereafter chapters on Congenital Malformation, Diseases of the Penis and Urethra, Affections of the Prostate and Seminal Vesicles, Prostatic Obstruction, Disease of the Scrotum and Testicles, Diseases of the Bladder, Diseases of the Kidneys and Ureters, Genitourinary Tuberculosis, Gonococcus Infecting the Female, Impotence and Sterility. These subject-matters are covered in something under 300 pages; clearly, with the presentation of modern concepts and methods; in a way which should be most helpful to the general practitioner who regards the treatment of these affections as a part but not the whole of his work.

GYNECOPLASTIC TECHNOLOGY. By Arnold Sturmdorf, M.D. F. A. Davis Company, Philadelphia, 1919. English Depot, Stanley Phillips, London. Price $5, net.

The present volume embodies an elaborated gynecological technology, each topic being presented in monographic form. The various operative procedures are detailed and illustrated to illuminate underlying principles of practice rather than to standardize individual methods.

There is a chapter on Sacral Anesthesia, the author holding that no work on Regional Surgery would be complete without a consideration of this subject. The author's attitude toward his subject is perhaps best illustrated by the following quotation: " 'The law of deflection' applied to the dynamics of that elusive force—intra-abdominal pressure—clarifies the problems of normal and abnormal uterine poise; it reveals the nature of congenital retropositions as compensatory static deviations, normal to certain types of skeletal contour, in which the multifarious corrective operations upon the uterine ligaments should be relegated to the limbo of the obsolete.

"The time has passed when the term 'endometritis' encompassed the beginning and end of uterine pathology—when 'reflex neurosis' presented the shibboleth of its general symptomatology, and 'curettement' the slogan of its therapy.

"Kundrat in 1873 exposed 'endometritis' as a normal premenstrual manifestation in pathological guise.

"Leopold in 1874 blazed the path to a rational uterine pathology by depicting the myometrial lymph course; and Henricius in 1889 unwittingly revealed a fundamental factor in uterine physiology by demonstrating that the normal non-gravid uterus is a rhythmically contracting organ.

"More recently, Hertoghe's observations on hypothyroidism established an endocrine pathogenesis in the category of metrorrhagias; and Rosenow succeeded in tracing the metastatic habilitation of bacteria within the ovarian tissues from distal latent foci.

"The biochemic factors evolved by these latter researches illumine the haze of the 'reflex neuroses,' in which we begin to discern lineaments of insidious sepsis and toxicosis.

"These specific phases of established validity and far-reaching significance are elucidated in a widely scattered literature, which has not yet been correlated to that concrete homogeneity essential to their more general dissemination and practical application."

Concerning Sacral Anesthesia the author states that when all is said and done, notwithstanding the positive claims embodied in the quoted excerpts, the region of the female genitalia and the pelvic floor do not offer an ideal field for major surgery under sacral anesthesia.

The book is beautifully and profusely illustrated. The author, as might be expected, bases his therapeutic measures largely on a sound knowledge of anatomy, physiology, and pathology. A helpful and stimulating work to the operating gynecologist.

War Surgery of the Face. By John B. Roberts, A.M., M.D., F.A.C.S. Illustrated. William Wood & Company, New York, 1919. Price $4.50.

This work is an endeavor, and a thoroughly serviceable one, on the part of the author to correlate the results of military and civil practice in traumatic surgery of the face. There is an excellent chapter on Surgical Anatomy. The first portion of the book is devoted to Reconstructive Treatment. It is taken up both in general principles and in detail. The book is a useful forerunner of probably an encyclopedic work which will include all the valuable lessons in cosmetic surgery.

NOTES AND QUERIES.

PRESCRIPTIONS FOR ALCOHOL.

The Commission of Internal Revenue has issued the following edict:

Physicians may prescribe wines and liquors, for internal use, or alcohol for external use, but in every such case each prescription shall be in duplicate, and both copies be signed in the physician's handwriting. The quantity prescribed for a single patient at a given time shall not exceed one quart. In no case shall a physician prescribe alcoholic liquors unless the patient is under his constant personal supervision.

All prescriptions shall indicate clearly the name and address of the patient, including street and apartment number, if any, the date when written, the condition or illness for which prescribed, and the name of the pharmacist to whom the prescription is to be presented for filling.

The physician shall keep a record in which a separate page or pages shall be allotted each patient for whom alcoholic liquors are prescribed, and shall enter therein, under the patient's name and address, the date of each prescription, amount and kind of liquors dispensed by each prescription, and the name of the pharmacist filling same.

Any licensed pharmacist or druggist may fill such prescription:

1. If his name appears on the prescription in the physician's handwriting.

2. If he has made application and received permit, Form 737, in accordance with the provisions of Treasury Decision 2788.

3. If he has qualified as retail liquor dealer by the payment of special tax.

No such prescription may be refilled.